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# MIDDLE FORK OF LITTLE BEAVER CREEK MAHONING AND COLUMBIANA COUNTIES, OHIO IMPACT ASSESSMENT REPORT

#### Prepared for:

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March 2000

Project No.: 933-6154



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Project No.: 933-6154

March 31, 2000

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RE:

MIDDLE FORK OF LITTLE BEAVER CREEK, OHIO

IMPACT ASSESSMENT REPORT

#### Gentlemen:

On behalf of RÜTGERS Organics Corporation (ROC), we enclose a comprehensive report on the 1999 sampling activities in the Middle Fork of Little Beaver Creek, Mahoning and Columbiana Counties, Ohio.

This report integrates the work of ROC's consultant (Davey Resource Group) conducted pursuant to the Work Plan submitted on June 23, 1999, with parallel studies undertaken by the Ohio Environmental Protection Agency (OEPA) Division of Surface Water. Data from the 1999 studies are compared with previous results from the Remedial Investigation associated with the Nease Site, and prior studies by OEPA. In addition, the biocriteria measurements made by OEPA are evaluated in accordance with the *Biological Criteria for the Protection of Aquatic Life* (OEPA, 1988) and the Ohio Water Quality Standards.

As previously anticipated by the Agencies, we expect that the results of these sampling efforts will assist in focusing the upcoming Feasibility Study, and any potential remediation efforts envisaged, so that the maximum environmental benefit can be obtained while minimizing disruption to the ecosystem.

We look forward to discussing these results with you. If you should have any immediate questions, please do not hesitate to contact Dr. Rainer Domalski of ROC at 814-238-9200.

Very truly yours,

GOLDER ASSOCIATES INC.

P. Stephen Finn, C.Eng.

Principal

cc: Dr. Rainer Domalski,

ROC

Ralph Pearce, P.E.,

ROC

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#### 1.0 INTRODUCTION

This report presents the results of a 1999 survey of the Middle Fork of Little Beaver Creek (MFLBC) in Mahoning and Columbiana Counties, Ohio. The survey included assessment of the fish and benthic macroinvertebrate communities and habitats, together with chemical analysis of surface water, sediment and fish tissue. Results are compared to previous studies of the fish and benthic macroinvertebrate communities conducted by the Ohio Environmental Protection Agency (OEPA) in 1985 and 1987, and sediment and fish tissue chemical analyses undertaken on behalf of RÜTGERS Organics Corporation (ROC) in 1991. The 1999 survey was conducted jointly by OEPA and ROC, and combined the survey routinely undertaken by OEPA's Division of Surface Water, with chemical analysis required by the United States Environmental Protection Agency (USEPA) and OEPA (Agencies) in connection with the Remedial Investigation (RI) and Feasibility Study (FS) of the Nease Chemical Site, Salem, Ohio. As noted by the Agencies, the combined sampling effort "will assist in focusing the Feasibility Study and any potential remediation efforts envisaged so that the maximum environmental benefit can be obtained while minimizing the disruption to the ecosystem caused by the cleanup" (USEPA, 1999).

#### 2.0 SCOPE OF 1999 INVESTIGATIONS

The scope of investigation was developed by the Agencies and ROC and included field surveys at fourteen locations throughout the length of the Creek (River Mile 1.9 to 40.3) with assessment of the following elements:

- Fish and benthic macroinvertebate communities, as indicated quantitatively by the Ohio Biological Criteria for the Protection of Aquatic Life (OEPA, 1988);
- Habitat conditions, based on field observations and summarized as OEPA's Qualitative Habitat Evaluation Index (QHEI);
- Recreational value of the fishery at each sample site based on the types, length and individual weight of fish species present;
- Fish tissue sampling according to OEPA's Fish Tissue Consumption Monitoring Program (FTCMP) protocol (OEPA, 1994) with laboratory analysis for mirex, photomirex and kepone;
- Sediment sampling with laboratory analysis for Target Compound List (TCL) volatile
  organic compounds (VOCs) semi-volatile organic compounds (SVOCs), pesticides, and
  polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals, mirex, photomirex
  and kepone, grain size and total organic carbon (TOC); and,
- Surface water sampling with field measurement of temperature, dissolved oxygen (DO), pH, total dissolved solids (TDS), conductivity and stream velocity, and laboratory analysis of Biological Oxygen Demand (BOD), total suspended solids (TSS) ammonia, nitrate, nitrite and phosphorous.

Field surveys were conducted jointly by biologists from OEPA and Davey Resource Group (Davey) consultants to ROC. All sample locations were agreed jointly in the field. OEPA had primary responsibility for collection of data for Biocriteria and QHEI Assessment, with Davey handling the remaining aspects of the survey. The field survey locations are illustrated in Figure 1 and summarized below:

River Mile	DESCRIPTION
40.3	BACKGROUND: UPSTREAM OF IDENTIFIABLE POINT SOURCE IMPACTS
38.2	UPSTREAM OF SALEM WASTEWATER TREATMENT PLANT (WWTP), DOWNSTREAM OF HISTORICAL DISCHARGES ON BUTTERMILK CREEK
37.7	IMMEDIATELY DOWNSTREAM OF SALEM WWTP, UPSTREAM OF NEASE
36.7	UPPER LOW FLOW AREA OF MFLBC, IMMEDIATELY DOWNSTREAM OF NEASE
33.3	UPPER LOW FLOW AREA OF MFLBC (MIDDLETOWN ROAD/UPSTREAM CROSSING)
32.0	HIGHER FLOWING AREA BEFORE EGYPT SWAMP

River Mile	DESCRIPTION
28.8	UPPER REACH OF EGYPT SWAMP
25.8	LOWER REACH OF EGYPT SWAMP
23.5	FASTER FLOWING SEGMENT
21.8	UPSTREAM OF EAST BRANCH TRIBUTARY
20.9	DOWNSTREAM OF EAST BRANCH TRIBUTARY
15.0	FORESTED RAVINE AREA ABOVE LISBON DAM
4.4	INTERMEDIATE LOCATION BELOW LISBON DAM
1.9	SEDIMENT DEPOSITION AREA

In addition to the above stations sampled by Davey, OEPA also collected biocriteria data from sites at River Miles 10.7. 10.0, 9 and 8.4.

A copy of the ROC Work Plan, previously approved by the Agencies, is provided as Appendix A. Deviations from this work plan were minor, necessitated by field conditions, and agreed with OEPA personnel (see Appendix B).

Complete descriptions of each sample site and photographs are provided in Appendix B.

#### 3.0 RESULTS OF 1999 INVESTIGATION

#### 3.1 Ohio Biocriteria

OEPA utilizes three biocriteria for the assessment of the aquatic health of streams and waterbodies:

- Invertebrate Community Index (ICI) which assesses benthic macroinvertebrate communities via ten structural and functional community metrics. Artificial substrate samplers are utilized to collect data for nine of the metrics and so substrate differences do not substantially impact the results;
- Modified Index of Well-Being (Modified I<sub>wb</sub>) which assesses the structural attributes of
  the fish community via the numbers, biomass, and diversity of fish species. In
  calculating the Modified I<sub>wb</sub>, the numbers and biomass of highly pollution tolerant species
  are eliminated to improve the sensitivity of the index to environmental stress; and,
- Index of Biotic Integrity (IBI) which assesses the functional characteristics of the fish community via twelve metrics covering species richness and composition, trophic composition, fish abundance and condition.

As noted by OEPA(1988) the IBI and Modified I<sub>wb</sub> taken together "provide a rigorous evaluation of overall fish community condition." Artificial substrate samplers for ICI data collection were deployed in June and recovered in September 1999. Two rounds of fish data were collected by OEPA during the June and September fieldwork.

The raw data for ICI, Modified I<sub>wb</sub> and IBI biocriteria are provided in Appendix C and the resulting indices are presented graphically in Figures 2 through 4. The graphical depictions also include the comparable data from OEPA's 1985 and 1987 studies, and the criteria values for the designated uses of each section of the creek in accordance with OAC 3745-1-07-5 Table 7-14 together with the associated ranges of insignificant departure (OEPA, 1988).

#### 3.2 Habitat Evaluation

OEPA evaluates the macro-habitat for fish by means of the Qualitative Habitat Evaluation Index (QHEI) which is based on substrate type, amount and type of instream cover, channel morphology development and stability, riparian zone width and composition, pool and riffle-run quality, gradient, and drainage area. The raw data from OEPA's assessment is provided in Appendix C, and QHEI data are presented graphically in Figure 5, together with the comparable data from OEPA's 1985 study. The range of data from unpolluted Ohio streams is also presented

in Figure 5 for comparison purposes. Target QHEI values are not designated in Ohio regulations, rather the data are used in interpreting the biocriteria results (OEPA, 1988).

The results of Davey's assessment of the Recreational Value of the Fishery at each sampling site are detailed in Appendix B and generally indicate ideal conditions in the lower reaches of the Creek with unsuitable to marginal conditions towards the headwaters. In addition to the effects of erosion, sedimentation, channelization and dredging (which are reflected in the QHEI) Davey also noted the fact that the Lisbon Dam constitutes a physical barrier to fish migration. This likely explains the absence of certain species, such as smallmouth bass, above the Lisbon Dam, in spite of the existence of suitable habitat.

#### 3.3 Fish Tissue

Samples of edible fish tissue were collected in accordance with OEPA protocol and analyzed for mirex, photomirex and kepone by Centre Analytical Laboratories (CAL), the laboratory approved by the Agencies for the RI/FS. Davey and OEPA selected individual specimens for tissue sampling in the field. In a few instances (River Miles 20.9, 23.5, 25.8 and 37.7) consensus was not achieved concerning which species and individuals should be sampled to reflect those which would be preferable to anglers; in these situations, two samples were collected to accommodate the best professional judgement of both OEPA and Davey biologists.

Laboratory analytical data was validated by Golder Associates (see Appendix D) and the validated data are summarized in Table 1. Photomirex was detected in only one sample, and kepone was not detected in any of the samples. Mirex data for the specimens selected by Davey is presented graphically in Figure 6 and the comparable data from 1991 is presented in the same format in Figure 7. Most notable is the fact that fish tissue concentrations are significantly lower than in 1991, with the large majority of the current data below the FDA Advisory Level of 100 ppb.

#### 3.4 Sediment

Sediment samples were analyzed by CAL with data validation performed by Golder Associates (see Appendix D). Pesticides (other than mirex) and PCBs were not detected, and VOC and SVOC constituents were detected very sporadically at low concentrations (see Tables 2 through 5). Metals were detected in all samples but with no discernable spatial trend that could be related

to the Nease Site (see Table 6). Metals concentrations do not exceed typical screening levels (OMOE, 1993) upstream of River Mile 25.8; below this point, exceedances may relate to coal mining/production operations, steel fabricators and other dischargers to the MFLBC. Validated data for mirex, photomirex and kepone are presented in Table 7 together with total organic carbon (TOC), percent fines, and percent solids. Photomirex was detected in only one duplicate sample (but was not present in the corresponding primary sample) and kepone was not detected in any of the samples. The mirex data are presented graphically in Figure 8. Sediment mirex data from earlier RI/FS studies are presented in the same format in Figure 9. Again, the most notable feature in the data is that concentrations are much lower than in previous sampling, and this is probably reflective of natural burial of contaminated sediment.

#### 3.5 Surface Water

Surface water data are summarized in Table 8. The most notable feature in this data is the marked effect of the Salem Wastewater Treatment Plant (WWTP) discharge just upstream of River Mile 37.7. Total dissolved solids, conductivity, nitrate, phosphorus and dissolved oxygen all show significant impacts at this location (which is upstream of discharges linked to the Nease site) and these impacts extend a significant distance downstream. Field notes taken by OEPA personnel also indicated "sewage odor in stream and sludge deposits along stream margin" at River Mile 37.7 and "minor sludge deposits along margins" at River Mile 36.7. These observations are consistent with OEPA's conclusions from earlier assessments that identified the most severe impacts as immediately downstream of the Salem WWTP with data "strongly suggesting sewage enrichment" (OEPA, 1991).

<sup>&</sup>lt;sup>1</sup> OEPA (1991) also drew attention to "an unusual proportion of deformities" downstream of Nease Chemical that were thought not to be associated with municipal sludge impacts. The recent data indicates that a very small numbers of fish deformities are now present.

#### 4.0 IMPACT ASSESSMENT

The following sections provide a synthesis of the historical and current biological and chemical data for the MFLBC so as to provide an overall assessment of the biological health of the stream. In addition, an updated assessment of the associated food chain risks and human health risks is provided in summary form for the purposes of the forthcoming Feasibility Study in connection with the Nease Site.

#### 4.1 Stream Biological Health

Comparison of the biocriteria results for 1985 and 1999 (Figure 2) indicates a marked improvement in benthic macroinvertebrates immediately downstream of the Salem WWTP and the Nease Site (River Mile 37.7 and 36.7). These changes likely result from improvements to the WWTP operations, as well as continued controls on the Nease Site. Invertebrate data at other sites as well as the fish community indices (Figures 3 & 4) show some general improvement since 1985. Current habitat conditions, as measured by the QHEI, are best characterized as similar to 1985.

OEPA has designated the use of the MFLBC in three sections:

- "Warmwater Habitat (WWH) Headwater Methodology" to approximately River Mile 31.5;
- "Warmwater Habitat (WWH) Wading Methodology" between River Miles 31.5 and 12.5; and,
- "Exceptional Warmwater Habitat (EWH) Wading Methodology" between River Mile 12.5 and the mouth.

In comparing the biocriteria to the designated use values specified in Table 14 of OAC 3745-1-07-5 it is important to note the following:

• Designated uses are based upon the assessed capability of a stream to theoretically attain the use. As noted by OEPA (1988) "only one of the three biological indices need demonstrate attainment...outside of any areas of chemical degradation" for use designation. Thus it is possible for a stream to not attain all of the criteria in the absence of any chemical contamination. As a result, a finding of non-attainment requires a failure of all indices to meet the applicable criterion (OEPA, 1988);

- OEPA (1988) has recognized that there is a statistical "range of insignificant departure" from regulated values. These ranges are indicated on Figures 2 through 4, and values within these ranges are deemed to attain the designated use; and,
- In order to designate WWH, QHEI values must exceed the 25<sup>th</sup> percentile value for WWH reference sites in the ecoregion (QHEI>70 for wading sites). Likewise, QHEI scores less than the 75<sup>th</sup> percentile value for Modified Warmwater Habitat (MWH) reference sites (QHEI<55 for wading sites) are an indication that WWH may not be attainable (OEPA, 1988).

#### 4.1.1 WWH-Headwater

Biocriteria values for headwater sites are limited to ICI and IBI, due to the extreme influence of drainage area on I<sub>wb</sub>. As noted previously, ICI values immediately downstream of the Salem WWTP have shown marked improvement since 1985, although the designated use value remains unattained at River Mile 37.7, closest to the WWTP discharge. The ICI and IBI values measured in the extreme headwaters at River Mile 40.3 also do not attain the designated use values, although this is likely habitat related and, due to their upstream location, cannot be influenced by the Nease site. Designated use values of IBI are not attained at River Miles 37.7 (just downstream of the Salem WWTP) and 36.7 (downstream of Salem WWTP and the Nease Site). In this case, the influence of the Salem WWTP appears most significant, since the mirex concentration at River Mile 37.7 is very low (21.2 ppb) and the concentration at River Mile 36.7 (442 ppb) although higher, does not exceed the conservative screening level of 480 ppb established in the Endangerment Assessment (ENVIRON/Weinberg, 1999).

#### 4.1.2 WWH-Wading

Within this section of the MFLBC, ICI values attain the designated use in all but one location (River Mile 20.9). Both of the Fish criteria, however, do not attain the designated use at River Miles 25.8 and 28.8 within the area known as Egypt Swamp. However, it is significant to note that at all three of these partial attainment locations, the habitat is significantly affected by channelization as indicated by the QHEI values. In all cases, the QHEI data indicate that WWH may not be attainable (QHEI<55)<sup>2</sup>. The partial attainment therefore likely reflects habitat conditions, and is unrelated to the Nease Site.

<sup>&</sup>lt;sup>2</sup> Conditions appear to represent an "irretrievable anthropogenic modification" since the gradient is <5 ft/mile in all cases, which likely precludes stream recovery according to OEPA (1989).

#### 4.1.3 EWH-Wading

Within this section of the MFLBC, both of the fish biocriteria attain the designated use values at all locations in at least one of the 1999 samples. In three cases (River Miles 4.4, 9, and 10.7) the macroinvertebrate criteria are not attained. Mirex was, however, only detected in one primary sample at a very low concentration and was not detected in associated field duplicate sample. This indicates that there has been no significant downstream transport of mirex in sediments since 1991. Overall, the designated use of this portion of the MFLBC is only partially attained; however, the lack of attainment cannot be related to the Nease Site.

#### 4.2 Food Chain Risks

The Endangerment Assessment (ENVIRON/Weinberg, 1999) included a comprehensive assessment of food chain risks to wildlife species exposed to the MFLBC. The only aquatic or semi-aquatic receptor for which a Hazard Quotient exceeding unity was calculated, was mink close to the Nease site. In this case, the Hazard Quotient was 2.5, based on a whole-body fish concentration for mirex of 1540 ppb. Although, whole-body samples were not collected in 1999, it is reasonable to assume that the ratio of whole-body to edible fish tissue concentration would be approximately the same in the 1991 and 1999 sampling events. Analysis of the 1991 data indicates a whole-body to edible ratio of between 1.4 and 2.7. Taking the higher ratio (to be conservative) in conjunction with the average edible concentration of 170 ppb³, indicates an equivalent 1999 whole-body fish concentration of approximately 459 ppb. Since, in this case, the Hazard Quotient is directly proportional to mirex concentration, a revised Hazard Quotient of 0.7 is estimated based on the current data, indicating no significant ecological risk.

#### 4.3 Human Health Risks

Human health risks due to fish ingestion upstream of Lisbon Dam were estimated at  $9.9 \times 10^{-5}$  (Reasonable Maximum) and  $9.5 \times 10^{-6}$  (Central Tendency) in the Endangerment Assessment (ENVIRON/Weinberg, 1999). These values were calculated based on an edible fish tissue Reasonable Maximum Exposure of 1270 ppb. The new data indicate a comparable edible fish tissue RME of 115 ppb, which in turn results in revised risk estimates of  $9.0 \times 10^{-6}$  (Reasonable Maximum) and  $8.6 \times 10^{-7}$  (Central Tendency).

<sup>&</sup>lt;sup>3</sup> Average concentration for Reach 1 (upstream of River Mile 25.8).

#### 5.0 CONCLUSIONS

The 1999 survey of MFLBC indicates significant improvement in the biological health of the aquatic system since previous sampling in 1985 and 1987. Remaining areas where the State's Designated Use criteria are only partially attained appear to be largely habitat related and not associated with mirex from the Nease Site. Mirex concentrations in fish tissue and sediment are also significantly lower than in previous sampling in 1991. As a result, estimated food chain risks to aquatic and semi-aquatic wildlife receptors are not expected to be significant. The large majority of edible fish tissue data no longer exceeds the FDA Advisory Level for mirex, and risks to human health are correspondingly lower than previously predicted. As anticipated by the Agencies, the upcoming Feasibility Study will utilize these data in focusing the Remedial Action Objectives and evaluating Remedial Alternatives for the MFLBC stream channel.

#### 6.0 REFERENCES

ENVIRON/Weinberg, 1999. Endangerment Assessment for the Nease Chemical Company Site, Salem, Ohio, June 1999.

Ohio Environmental Protection Agency (see OEPA)

OEPA, 1988. Biological Criteria for the Protection of Aquatic Life: Volumes I, II, and III.

OEPA, 1989. The Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods and Application.

OEPA, 1991. Monitoring Results for Middle Fork of Little Beaver Creek: 1985 & 1987. Inter-office Communication from Chris Yoder dated November 8, 1991.

OEPA, 1994. Fish Tissue Monitoring Program Guidance Manual: MAS/1994-11-1.

Ontario Ministry of Environment, 1993. Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario.

U.S. Environmental Protection Agency (see USEPA)

USEPA, 1999. Letter from USEPA and OEPA to RÜTGERS Organics Corporation dated February 3, 1999.

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Table 1

MPK Data Summary for Fish Tissue Samples

MFLBC July, 1999

RÜTGERS Organics Corporation

				Mirex	Mirex	Photomirex	Photomirex	Kepone	Kepone
Lab ID	Matrix	Sample ID	Fish Type	Result	Qualifier	Result	Qualifier	Result	Qualifier
L23745-4	Fish	FT 383	Yellow Bullhead	23.9	J	ND	C	ND	U
L23768-2	Fish	FT 378-A	Yellow Bullhead	60.9	N	ND	υ	ND	U
L23768-3	Fish	FT 378-B	White Sucker	ND	U	ND	U	ND	U
L23768-4	Fish	FT 367	White Sucker	133.0	Ν	ND	U	ND	U
L23769-2	Fish	FT 333	Carp	378.4	Ν	31.3	J	ND	U
L23778-1	Fish	FT 320	White Sucker	54.8	J	ND	U	ND	U
L23778-3	Fish	FT 288	Carp	320.4	N	ND	Ü	ND	U
L23777-2	Fish	FT 258-A	Carp	470.6	N	ND	U	ND	U
L23777-3	Fish	FT 258-B	White Sucker	56.9	N	ND	υ	ND	U
L23789-2	Fish	FT 235A	Carp	450.8	N	ND	U	ND	U
L23789-3	Fish	FT 235B	Bluegill	144.5	N	ND	U	ND	U
L23815-1	Fish	FT 218	Rock Bass	251.3	N	ND	U	ND	U
L23815-3	Fish	FT 209-A	Largemouth Bass	ND	U	ND	U	ND	U
L23815-4	Fish	FT 209-B	Bluegill	31.4	J	ND	υ	ND	U
L23885-3	Fish	FT 150	White Sucker	ND	U	ND	U	ND	Ų
L23885-5	Fish	FT 50	Smallmouth Bass	ND	U	ND	U	ND	U
L23885-4	Fish	FT 19B	Channel Cat	ND	U	ND	U	ND	U
L23913-6	Fish	FT 19A	Smallmouth Bass	ND	U	ND	U	ND	U

All units are in ug/kg (ppb).

Qualifiers are defined as follows:

- U = Analyte not detected Reporting limits Mirex: 52.7 60 ppb; Photomirex: 57.8 66.1 ppb; Kepone: 187 214 ppb.
- J = Analyte detected at a concentration below the sample reporting limit.
- N = tentatively Identified. Analyte presence strongly indicated but ion abundance ratio criteria are not met. This may be due to sample matrix effects.

Page 1 of 2

Pesticide Data Summary for Sediment Samples MFLBC July, 1999
RÜTGERS Organics Corporation Table 2

March 2000

	8108	2,00	4000	neine	201.02	80708	SD218	SD235	SD258	SD852
Parameter	[ug/kg]	[ng/kg]	[ug/kg]							
4,4'-DDD	0.92 U	<b>~</b>	1.1 U	1.2 U	0.89 U	1.1 U	1.4 ∪	1.1 U	1.2 U	1.2 U
4,4'-DDE	0.92 U	٦ -	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
4,4'-DDT	0.92 U	10	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
aldrin	0.92 U	<b>~</b>	1.1 0	1.2 U	0.89 U	1.1 U	1.4 U	1.10	1.2 U	1.2 U
alpha-BHC	0.92 U	10	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
beta-BHC	0.92 U	1 C	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Chlordane	46 U	52 U	55 U	58 U	44 U	53 U	7 U	55 U	O 09	09
delta-BHC	0.92 U	10	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Dieldrin	0.92 U	10	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Endosulfan I	0.92 U	10	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Endosulfan II	0.92 U	10	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Endosulfan Sulfate	0.92 U	10	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Endrin	0.92 U	J C	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Endrin Aldehyde	0.92 U	10	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Endrin Ketone	0.92 U	1 C	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
gamma-BHC	0.92 U	1 C	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Hepatchlor	0.92 U	1 0	1.1 U	1.2 U	0.89 U	1.1 0	1.4 U	1.1 U	1.2 U	1.2 U
Hepatchlor Epoxide	0.92 U	٦ ا	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Methoxychlor	0.92 U	10	1.1 U	1.2 U	0.89 U	1.1 U	1.4 U	1.1 U	1.2 U	1.2 U
Toxaphene	46 U	52 U	55 U	58 U	44 U	53 U	71 U	25 U	n 09	O9

Table 2
Pesticide Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

	SD288	SD320	SD333	SD367	SD763	SD378	SD383	SD838	SD403
Parameter	[ug/kg]								
4,4'-DDD	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
4,4'-DDE	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
4,4'-DDT	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
aldrin	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
alpha-BHC	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
beta-BHC	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Chlordane	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U
delta-BHC	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Dieldrin	0.89 ป	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Endosulfan i	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Endosulfan II	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Endosulfan Sulfate	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Endrin	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Endrin Aldehyde	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Endrin Ketone	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
gamma-BHC	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Hepatchlor	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Hepatchlor Epoxide	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Methoxychlor	0.89 U	0.81 U	0.95 U	0.85 U	0.81 U	0.85 U	0.83 U	0.82 U	0.8 U
Toxaphene	45 U	41 U	· 47 U	43 U	41 U	43 U	41 U	41 U	40 U

SD54 is the field duplicate of SD45.

SD852 is the field duplicate of SD258.

SD763 is the field duplicate of SD367.

SD838 is the field duplicate of SD383.

Table 3
Polychlorinated Biphenyls (PCB) Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

	SD19	SD45	SD54	SD150	SD105	SD209	SD218	SD235	SD258	SD852
Parameter	[ug/kg]									
									"	
AROCLOR-1016/1242	46 U	52 U	55 U	58 U	44 U	53 U	71 U	55 U	60 U	60 U
AROCLOR-1221	46 U	52 U	55 U	58 U	44 U	53 U	71 U	55 ป	60 U	60 U.
AROCLOR-1232	46 U	52 U	55 U	58 U	44 U	53 U	71 U	55 U	60 U	60 U
AROCLOR-1248	46 U	52 U	55 U	58 U	44 U	53 U	71 U	55 U	60 U	60 U
AROCLOR-1254	46 U	52 Ų	55 U	58 U	44 U	53 U	71 U	55 U	60 U	60 U
AROCLOR-1260	46 U	52 U	55 ป	58 U	44 U	53 ป	71 U	55 U	60 ป	60 U

	SD288	SD320	SD333	SD367	SD763	SD378	SD383	SD838	SD403
Parameter	[ug/kg]_	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]
						· · · · ·			
AROCLOR-1016/1242	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U
AROCLOR-1221	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U
AROCLOR-1232	45 U	41 Ú	47 U	43 U	41 U	43 U	41 U	41 U	40 U
AROCLOR-1248	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U
AROCLOR-1254	45 U	41 U	47 U	43 U	41 U	43 U	·41 U	41 U	40 U
AROCLOR-1260	45 U	41 U	47 U	43 U	41 U	43 U	41 U	41 U	40 U

SD54 is the field duplicate of SD45.

SD852 is the field duplicate of SD258.

SD763 is the field duplicate of SD367.

SD838 is the field duplicate of SD383.

Page 1 of 2

Table 4
Volatile Organic Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

Parameter	SD19 [ug/kg]	SD45 [ug/kg]	SD54 [ug/kg]	SD150 [ug/kg]	SD105 [ug/kg]	SD209 [ug/kg]	SD218 [ug/kg]	SD235 [ug/kg]	SD258 [ug/kg]	SD852 [ug/kg]
4 4 4 Trichloroethans			0	ď	7.11	α	5		-	-
1,1,1-IIICIBOCOGUBIO	) = 0 «	) = 0 a	0 =	) = 0 %	) = -	0 0		ο α		0 =
1, 1, 2, 2=1 culable motoruland	2 2		0 0		- ^	_				) = 0 0
1,1,2-Inchicocothone	9 5		0 =		- ^		5 =		2 5	
1,1-Dichlombenzene		) = 0 «	) = 0 o		- ^				2 5	) = 0 0
1 2-Dihromo-3-Chloromoane	9 2		0 0		7					0 0
1.2-Dibromoethane	) )		)     6				100		10 0	) )
1,2-Dichlorobenzene	0 9		∩ 6				10 0		10 U	∩ 6
1,2-Dichloroethane	0 0	9 N	0 6		7 U	8 U	10 U	89	10 U	0 6
1,2-Dichloropropane	O 9	8 ∪	0 6	0.9	7 0	8 U	10 U	8 U	10 U	_ ე 6
1,3-Dichlorobenzene	∩9	8 ∪	<b>∩</b> 6	9	7 U	8 ∪		œ	10 U	16
1,4-Dichlorobenzene	∩ 9	9 0	ე ნ	0 P	0 Z	8 U	5 U	۵	10 U	0 G
2-Butanone	12 U	. 22 U	17 0	13 U	14 U	210	27 U	16	089 N	43 ∪
2-Hexanone	12 U	15 U	17 U		14 U	16 U	21	16	19 U	18 U
4-Methyl-2-Pentanone	12 U	15 U	17 U	13 U	14 U	16 U			19 U	18 U
Acetone		180 U	510		46 U		O ' 16(		350	210 U
Benzene			∩ 6				4.		10 U	n 6
Bromochloromethane			ე გ.		1 n				10 U	
Bromodichloromethane			_ 6		1 N		10 U	∞	10 U	ე 6
Bromoform		5 ∞		η 9	7 U	0 %	10 U	∞	10 U	n 6
Bromomethane			14 0		74 U	16 U	_ হ		19 U	18 U
Carbon Disulfide			10 C		14 U	 14 ∪	(S)		<b>8</b> 8	27
Carbon Tetrachloride	∩ 9		⊃ 6		0 Z	0 8	)		<b>P P</b>	 
Chlorobenzene	0.9	0	∩ 6		7 0	⊃ ∞			10 U	∩ 6
Chloroethane	12 U	15 U	17 U	13 U	14 U	16 U			19 N	18 C
Chloroform	11 C	유	<b>4</b> ∪ <b>4</b>	1	20 0	52 ∩		18	14 U	24 0
Chloromethane			17 U			16 U		16	19 U	18 U
cis-1,2-Dichloroethene	∩ 9		_ റ		_	⊃ :		<b>∞</b>	10 U	_ 6
cis-1,3-Dichloropropene	⊃ •				7 0	∩ 8	_ / ₽ :		10 U	∩ 6
Dibromochloromethane						7.2	2 2		10 U	0
Dichloromethane	⊃ ໑						5 ⊃		10 U	
Ethylbenzene			<b>∩</b> 6		7 0		₽	_	10 U	_ ∩ 6
m.p-Xylene			∩ 6			0 8	10 ℃		10 U	<b>⊃</b> 6
o-Xylene			<b>∩</b> 6				10 C		10 U	∩ 6
Styrene			⊃ 6		7 U		10 C		10 U	N 6
Tetrachloroethene		- 8	) 6				1404		10 U	ე 6
Toluene	∩ 9	8	15)		1 n		3.	8 ∪	10 U	⊃ 6
trans-1,2-Dichloroethene	9	- 8	ე 6		0 Z		100	∞		) 6
trans-1,3-Dichloropropene	0 9		<b>⊃</b> 6		0 Z		2 ○	_	10 U	ე წ
Trichloroethene	) 9	n ;	⊃ : ຄຸ	) 0 9	n 2	⊃ ;	2 2	⊃ :	D 01	) 6 (
Vinyi Chloride	22	2		2	*	2	2		2	

Table 4
Volatile Organic Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

	SD288	SD320	SD333	SD367	SD763	SD378	SD383	SD838	SD403
Parameter	[ug/kg]								
1,1,1-Trichloroethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,1,2,2-Tetrachloroethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,1,2-Trichloroethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,1-Dichloroethene	7 Ų	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,2,4-Trichlorobenzene	7 U	6 Ų	7 U	7 U	6 U	6 U	. 6 U	`7 U	6 U
1,2-Dibromo-3-Chloropropane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,2-Dibromoethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,2-Dichlorobenzene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,2-Dichloroethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
1,2-Dichloropropane	7 U	6 U	7 Ü	7 U	6 U	6 U	6 U	7 U	6 U
1,3-Dichlorobenzene	7 U	6 U	7 U	7 U	6 Ų	6 U	6 U	7 U	6 U
1,4-Dichlorobenzene	7 Ų	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
2-Butanone	27 Ų	13 U	17 U	18 U	15 U	14 U	15 U	17 U	29 U
2-Hexanone	14 U	13 U	15 U	13 U	13 U	13 U	12 U	13 U	13 U
4-Methyl-2-Pentanone	14 U	13 U	15 U	13 U	13 U	13 U	12 U	13 U	13 U
Acetone	94 U	26 U	49 U	60 U	29 U	26 U	30 U	23 U	76 U
Benzene	7 U	6 U	7 Ų	7 U	6 U	6 U	6 U	7 U	6 U
Bromochloromethane	7 Ų	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Bromodichloromethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Bromoform	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Bromomethane	14 U	13 U	15 U	13 U	13 U	13 U	12 U	13 U	13.U
Carbon Disulfide	8 ∪	6 U	7 U	7 U	6 U	7 U	8 U	7 U	17)
Carbon Tetrachloride	7 ∪	6 U	7 U	7 U	6 U	6 U	6 U	7 U	<u>√6</u> U
Chlorobenzene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Chloroethane	14 U	13 U	15 U	13 U	13 U	13 U	12 U	13 U	13 U
Chloroform	22 U	13 U	10 U	15 U	15 U	13 U	23 U	22 U	12 U
Chloromethane	14 U	13 U	15 U	13 U	13 U	13 U	12 U	13 U	13 U
cis-1,2-Dichloroethene	7 U	6 Ų	7 U	7 U	6 U	6 U	6 U	: 7 U	6 U
cis-1,3-Dichloropropene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Dibromochloromethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Dichloromethane	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Ethylbenzene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
m,p-Xylene	7 U	6 υ	7 U	7 U	6 U	6 U	6 U	7 U	6 U
o-Xylene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	70	6 U
Styrene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	70	6 U
Tetrachloroethene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Toluene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
trans-1,2-Dichloroethene	7 U	6 U	. 7 U	7 U	6 U	6 U	6 U	7 U	6 U
trans-1,3-Dichloropropene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Trichloroethene	7 U	6 U	7 U	7 U	6 U	6 U	6 U	7 U	6 U
Vinyl Chloride	14 U	13 U	15 U	13 Ų	13 U	13 U	12 U	13 U	13 U

SD54 is the field duplicate of SD45. SD852 is the field duplicate of SD258, SD763 is the field duplicate of SD367. SD838 is the field duplicate of SD383.

Table 5
Semi-Volatile Organic Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

								· · · · · · · · · · · · · · · · · · ·		
	SD19	SD45	SD54	SD150	SD105	SD209	SD218	SD235	SD258	SD852
Parameter	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]
					1					
1,2,4-Trichlorobenzene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
1,2-Dichlorobenzene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
1,3-Dichlorobenzene	450 U	520 U	550 U	590 U	440 U	530 ป	710 U	540 U	590 U	610 U
1,4-Dichlorobenzene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	- 590 U∖	610 U
2,4,5-Trichlorophenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2,4,6-Trichlorophenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2,4-Dichlorophenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2,4-Dimethylphenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2,4-Dinitrophenol	910 U	1000 U	1100 U	1200 U	880 U	1100 U	710 U	1100 U	1200 U	1200 U
2,4-Dinitrotoluene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2,6-Dinitrotoluene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2-Chioronaphthalene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2-Chiorophenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2-Methyl-4,6-Dinitrophenol	1100 U	1300 U	1400 U	15 <u>00</u> U	1100-U	- 1400 U	1800 U	1360 U	1500 U	1500 U
2-Methylnaphthalene	(240 J	520 U	550 ป	200 J	140 J	96 J	160 J	540 U	590 U	610 U
2-Methylphenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
2-Nitroaniline	910 U	1000 U	1100 ป	1200 U	880 บ	1100 U	1400 U	1100 U	1200 U	1200 U
2-Nitrophenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 ป
3&4-Methylphenol	450 U	520 U	550 U	590 U	440 U	530 ป	710 U	540 U	590 U	610 U
3,3'-Dichlorobenzidine	1100 U	1300 U	1400 U	1500 ปั	1100 U	1400 ป	1800 U	1360 U	1500 U	1500 ป
3-Nitroaniline	910 U	1000 U	1100 U	1200 U	880 U	1100 U	1400 U	1100 U	1200 U	1200 U
4-Bromophenyl Phenyl Ether	450 U	520 U	550 U	590 ป	440 U	530 ป	· 710 U	540 U	590 U	610 U
4-Chloro-3-Methylphenol	450 U	520 U	550 U	590 U	440 ป	530 ป	710 U	540 U	590 U	610 U
4-Chloroaniline	450 U	520 U	550 U	590 U	440 U	530 U	710 บ	540 U	590 U	610 U
4-Chlorophenyl Phenyl Ether	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 ป
4-Nitroaniline	910 U	1000 U	1100 ป	1200 U	880 U	1100 U	1400 U	1100 U	1200 ป	1200 U
4-Nitrophenol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Acenaphthene	450 U	520 U	550 U	590 ป	440 U	√180 J \	710 U	540 U	590 U	610 U
Acenaphthylene	450 U	520 U	550 U	590 U	440 U	61 J	710 U	540 U	590 ป	610 U
Anthracene	450 U	520 U	550 U	590 U	440 U	460 J	710 U	540 U	590 U	610 U
Benzo(a)anthracene	450 U	520 U	550 U	590_U	∕ 56 J ∖	1100	710 U	540 U	590 U	610 U
Benzo(a)pyrene	450 U	520 ป	550 U	<b>70 J</b> ∖	/ 110 J △	1500	710 U	540 U	590 U	610 U
Benzo(b)fluoranthene	450 U	520 ป	550 ป	/. 89 J ∖	100 J	1200	710 U	540 U	590 U	610 U
Benzo(g,h,i)perylene	450 U	520 U	550 U	√ 68 J 🗸	√ 93 J	850	710 U	540 U	590 U	610 ป
Benzo(k)fluoranthene	450 U	520 U	550 U	745	ે 100 ગ 🗸	1400	710 U	540 U	590 U	610 U

Table 5
Semi-Volatile Organic Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

	SD19	SD45	SD54	SD150	SD105	SD209	SD218	SD235	ODOSO	00000
Parameter	1			Ĭ				,	SD258	SD852
ra) allietei	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]	[ug/kg]
Benzoic Acid	910 U	1000 IJ	1100 U	1200 U	880 U	1100 U	1400 ป	1100 U	1200 U	1200 U
Benzyl Alcohol	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	
bis(2-Chloroethoxy)methane	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U		610 U
, , , , , , , , , , , , , , , , , , , ,	450 U	520 U	550 U		440 U				590 U	610 U
bis(2-Chloroethyl)ether	450 U	520 U		590 U		530 U	710 U	540 U	590 U	610 U
bis(2-Chloroisopropyl)ether	1		550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
bis(2-Ethylhexyl) phthalate	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Butylbenzyl phthalate	450 U	520 U	550 U	590 U	440-U_	530 U	710 U	540 U	590 U	610 U
Chrysene	[ (51 J/	520 U	550 U	〔69 J	72 J	1100~~	710 U	540 U	590 U	610 U
Dibenz(a,h)anthracene	450 U	520 U	550 U	590 U	440 U	″∖ 240 J	710 ป	540 บ	590 U	610 U
Dibenzofuran	( 61 J)	520 U	550 U	590 ぴ	440 U	<u>89 J</u> ∕	710 U	540 U	590 U	610 U
Diethyl phthalate	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Dimethyl phthalate	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Di-n-butyl phthalate	450 U	520 U	550 U	590 ป	440 U	530 U	710 U	540 U	590 U	610 U
Di-n-octyl phthalate	450 ₺	520 U	550 U	590 U	440 ป	530 U	710 U	540 U	590 U	610 U
Fluoranthene	/ 86 J √	520 U	550 U	/ 92 J)	□ 130 J	/ 2300	710 U	540 U	590 U	610 U
Fluorene	450 Ú	520 U	550 U	590 Ú	440 U	230 J	710 U	540 U	590 U	610 U
Hexachlorobenzene	450 U	520 U	550 U	590 U	440 U	260 J	710 U □	540 U	590 U	610 ป
Hexachiorobutadiene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	540 Ü	590 U	610 U
Hexachlorocyclopentadiene	450 U	520 U	550 U	590 U	440 U	530 U	710 U	- 540 U	590 U	610 U
Hexachloroethane	450 U	520 U	550 U	590 U	440 U	530-⊎.	710 U	540 U	590 U	610 U
Indeno(1,2,3-cd)pyrene	450 U	520 U	550 U	590 U	77 Ĵ	810	710 U	540 U	590 U	610 U
Isophorone	450 U	520 U	550 U	590 U	440 Ú	530 U	710 U	540 U	590 U	610 U
Naphthalene	160 J	520 U	550 U	∕130 Ĵ	92 J	78 J	710 U	540 U	590 U	610 U
Nitrobenzene	450 U	520 U	550 U	590 U	440 U	530-⊍	710 U	540 U	590 U	610 U
N-Nitroso-di-n-propylamine	450 U	520 U	550 U	590 U	440 U	530 U	710 Ú	540 U	590 U	610 U
N-Nitrosodiphenylamine	450 U	520 U	550 ป	590 U	440 U	530 U	710 U	540 U	590 U	610 U
Pentachlorophenol	910-0	1000 U	1100 U	1200-U	880 U	1160-U	710 U	1100 U	1200 U	1200 U
Phenanthrene	180 ]	520 U	550 U	( 150 J ∕	140 J	1600	710 U	540 U	590 U	610 U
Phenoi	450 U	520 U	550 U	590 U	440 Ú	530-ປ	710 U	540 U	590 U	610 U
Pyrene	79 J	520 U	550 U	110 J	√ 130 J \	2500°	710 U	540 U	590 U	610 U

SD54 is the field duplicate of SD45. SD852 is the field duplicate of SD258. SD763 is the field duplicate of SD367. SD838 is the field duplicate of SD383.

Table 5 Semi-Volatile Organic Data Summary for Sediment Samples MFLBC July, 1999 RÜTGERS Organics Corporation

	SD288	SD320	\$D333	SD367	SD763	SD378	SD383	SD838	\$D403
Parameter	[ug/kg]	[ug/kg]							
1,2,4-Trichlorobenzene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
1,2-Dichlorobenzene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
1,3-Dichlorobenzene	450 ป	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
1.4-Dichlorobenzene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2,4,5-Trichlorophenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2,4,6-Trichlorophenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2,4-Dichtorophenol	450 U	400 ป	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2,4-Dimethylphenol	450 U	400 U	470 U	440 U	410 ป	430 U	410 U	410 U	410 U
2,4-Dinitrophenol	890 U	800 U	940 U	870 U	810 U	850 U	830 U	820 U	810 U
2,4-Dinitrotoluene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2,6-Dinitrotoluene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2-Chloronaphthalene	450 U	400 U	470 U	440 Ú	410 U	430 U	410 U	410 U	410 ป
2-Chlorophenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2-Methyl-4,6-Dinitrophenol	1100 U	1000 ป	1200 U	1100 U	1000 U	1100 U	1000 U	1000 U	1000 U
2-Methylnaphthalene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
2-Methylphenol	450 U	400 U	470 U	440 ป	410 U	430 U	410 U	410 U	410 U
2-Nitroanifine	890 บ	800 U	940 ป	870 U	810 U	850 U	830 Ù	820 U	810 U
2-Nitrophenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
3&4-Methylphenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
3,3'-Dichlorobenzidine	1100 U	1000 U	1200 U	1100 U	1000 U	1100 U	1000 U	1000 U	1000 U
3-Nitroaniline	890 U	800 U	940 U	870 U	810 U	850 U	830 U	820 U	810 U
4-Bromophenyl Phenyl Ether	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
4-Chloro-3-Methylphenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
4-Chloroaniline	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
4-Chlorophenyl Phenyl Ether	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
4-Nitroaniline	890 บ	800 U	940 U	870 U	810 U	850 U	830 U	820 U	810 U
4-Nitrophenol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Acenaphthene	450 U	400 U	470 U	440 Ü	410 U	430 U	410 U	410 U	410 U
Acenaphthylene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Anthracene	450 U	400 U	470 U	440 U	410 U	430 U	70 J	110 J	410 U
Benzo(a)anthracene	450 ป	400 U	470 U	440 U	410 U	430 U	190 J	170 J	410 U
Benzo(a)pyrene	450 U	400 U	. 470 U	440 U	410 U	430 U	200 J	∷ 170 J	410 U
Benzo(b)fluoranthene	450 U	400 U	470 U	440 U	410 U	430 U	200 J	150 J	410 U
Benzo(g,h,i)perylene	450 U	400 U	470 U	440 U	410 U	430 U	√ 140 J	110 J	410 U
Benzo(k)fluoranthene	450 U	400 U	470 U	440 U	410 U	430 U	∖ 200 J	160 J <i>)</i>	410 U

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Table 5
Semi-Volatile Organic Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

March 2000

	SD288	SD320	SD333	SD367	SD763	SD378	SD383	SD838	SD403
Parameter	[ng/kg]	[ng/kg]	[ug/kg]	[ug/kg]	[ng/kg]	[ug/kg]	[ng/kg]	[ug/kg]	[ng/kg]
Benzoic Acid	U 068	300 U	940 U	870 U	810 U	850 U	830 U	820 U	810 U
Benzyl Atcohol	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
bis(2-Chloroethoxy)methane	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
bis(2-Chloroethyl)ether	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
bis(2-Chloroisopropyl)ether	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
bis(2-Ethylhexyl) phthalate	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Butylbenzyl phthalate	450 U	400 · U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Chrysene	450 U	400 U	470 U	440 U	410 U	430 U		180 J	410 U
Dibenz(a,h)anthracene	450 U	400 U	470 U	440 U	410 U	430 U	ل و≱ـ	410 U	410 U
Dibenzofuran	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Diethyl phthalate	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Dimethyl phthalate	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Di-n-butyl phthalate	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Di-n-octyl phthalate	450 U	400 U	470 U	440 U	410-U	430 U	410 U	410 U	410 U
Fluoranthene	450 U	400 U	470 U	િષ		430 U	√450	450	410 U
Fluorene	450 U	400 U	470 U	440 U	4100	430 U	45.4	410-0	410 U
Hexachlorobenzene	450 U	400 U	470 U	440 U	410 O	430 N	410 U	410 U	410 U
Hexachiorobutadiene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Hexachlorocyclopentadiene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Hexachloroethane	450 U	400 U	470 U	440 U	410 U	430 N	410 U	410 U	410 U
Indeno(1,2,3-cd)pyrene	450 U	400 €	470 U	440 U	410 U	430 U	110 1	∫ 001	√ 410 U
Isophorone	450 U	400 ∪	470 U	440 U	410 U	430 U	-440 A	410_U	410 U
Naphthalene	450 U	400 ∪	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Nitrobenzene	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
N-Nitroso-di-n-propylamine	450 U	400 ∪	470 U	440 U	410 U	430 U	410 0	410 U	410 U
N-Nitrosodiphenylamine	450 U	400 U	470 U	440 U	410 U	430 U	410 U	410 U	410 U
Pentachlorophenol	068	008	940 U	870 U	810 U	850 U	830-U	—820 U	810 U
Phenanthrene	450 U	400 U	470 U	440 U	42.1	> 430 U	ு 360	340 ⊅	410 U
Phenol	450 U	400 N	470 U	440 Ú	410 U	430 U	450D	410-0	410 U
Pyrene	450 U	400 U	470 U	( 21 ਹ	્ર 53 Jે\	430 U	380 J	1990	, 410 U
								1	

SD54 is the field duplicate of SD45. SD852 is the field duplicate of SD258. SD763 is the field duplicate of SD367. SD838 is the field duplicate of SD383.

Table 6
Metals Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

	SD19	SD45	SD54	SD150	SD105	SD209	SD218	SD235	SD258	SD852
Parameter	[ug/kg]									
						_				
Aluminum	2220000	5300000	4320000	4370000	3130000	5820000	8520000	7450000	5540000	5340000
Antimony	203 B	217 B	323 B	269 B	271 B	325 B	21.5 U	401 B	45.8 B	35.9 B
Arsenic	5690	6340	9590	9490	7420	7850	12500	22700	4940	4700
Barium	58500	93600	82500	136000	70700	109000	233000	106000	68100	63700
Beryllium	526 B	894 B	874 B	734 B	598 B	946 B	1490	1600	918	887
Cadmium	159 B	208 B	225 B	237 B	263 B	489 B	532 B	383 B	435 B	387 B
Calcium	1370000	1390000	1190000	1430000	1550000	5020000	3500000	2390000	2230000	2040000
Chromium	5440	11600	10400	8430	7830	8880	12400	10700	9390	8920
Cobalt	6840 B	10700 B	10800 B	10000 B	7310 B	10700 B	13100 B	9420 B	9420 B	9300 B
Copper	23000	21900	24700	13200	8540	14100	16200	17500	12700	12100
Iron	20100000	34800000	38100000	42800000	30300000	28300000	26200000	41400000	16800000	16400000
Lead	13600	23600	17800	20100	18900	21900	22800	54500	20300	19100
Magnesium	723000 B	1700000	1380000	1330000	952000 B	1580000	2070000	2160000	1310000	1260000
Manganese	704000	779000	893000	591000	623000	811000	1160000	1390000	260000	259000
Mercury	55.3	54.9	59.3	62.4	51.2	100	89	143	59.3	94.5
Nickel	13200 B	19600 B	18800 B	23600 B	16100 B	21600 B	26000 B	18200 B	20100 B	20100 B
Potassium	255000 B	455000 B	405000 B	511000 B	289000 B	421000 B	452000 B	483000 B	338000 B	325000 B
Selenium	267 B	310 B	293 B	272 B	295 B	514 B	557 B	131 B	201 B	261 B
Silver	44.7 B	53.3 B	52.2 B	65.7 B	75.8 B	142 B	62.9 B	34.1 B	225 B	177 B
Sodium	54500	64000	58000	60100	46300	173000	147000	90300	165000	161000
Thallium	76.7 B	118 B	115 B	304 B	195 B	449 B	245 B	548 B	150 B	518 B
Vanadium	6450 B	14200	12200	9650 B	.8540 B	11500	12800	14100	8890	8470
Zinc	46500	59400	57900	75000	71100	91300	83000	80500	79800	114000

Table 6
Metals Data Summary for Sediment Samples
MFLBC July, 1999
RÜTGERS Organics Corporation

							· · · · · · · · · · · · · · · · · · ·		
	SD288	SD320	SD333	SD367	SD763	SD378	SD383	SD838	SD403
Parameter	[ug/kg]	[ug/kg]	[ug/kg]						
Aluminum	1040000	2540000	2210000	2140000	1910000	3760000	1960000	2620000	3080000
Antimony	21.5 U	21.5 U	31.4 B	114 B	21.5 U	55.5 B	29.8 B	68.4 B	55.4 B
Arsenic	1340 B	3830	4470	2980	2790	4570	4060	4250	4780
Barium	21100 B	34000	32300	43800	28300	42100	17800 B	42000	41300
Beryllium	103 B	367 B	294 B	215 B	226 B	401 B	362 B	475 B	981
Cadmium	63.5 B	80.3 B	113	159 B	92.8 B	97.9 B	114 B	201 B	133 B
Calcium	358000 B	1300000	2590000	1940000	1240000	2090000	1810000	2840000	11000000
Chromium	1880	4640	5160	14200	4630	7170	4270	7490	6480
Cobalt	1690 B	3730 B	3040 B	3380 B	3350 B	4890 B	3090 B	3900 B	3410 B
Copper	2240 B	5260	6720	7020	6140	11200	5610	9920	5560
Iron	3770000	15600000	16700000	9440000	9590000	15100000	16100000	16100000	25500000
Lead	3270	10400	10300	10000	7950	13800	8610	14200	12500
Magnesium	315000 B	1020000	1280000	860000	921000	1440000	1010000	1270000	2460000
Manganese	47400	307000	418000	259000	159000	269000	237000	304000	579000
Mercury	21.5 U	21.5 U	27.7	28.2	21.5 U	21.5 U	28.7	43	21.5 U
Nickel	3380 B	8830 B	7060 B	9380 B	7830 B	11600 B	8160 B	11100 B	6660 B
Potassium	70200 B	160000 B	184000 B	174000 B	127000 B	279000 B	134000 B	159000 B	252000 B
Selenium	47.3 U	47.3 U	64.5 B	47.3 U	47.3 U	47.3 U	47.3 U	47.3 U	127 B
Silver	24.7 U	24.7 U	88.2 B	139 B	24.7 U	24.7 U	24.7 U	24.7 U	24.7 U
Sodium	102000	102000	143000	234000	46700	141000	23200	70300	85100
Thallium	25.2 B	57.7 B	59.2 B	51 B	51.4 B	90.7 B	229 B	130 B	122 B
Vanadium	1870 B	5640 B	5660 B	4380 B	3760 B	7430	5060 B	6940	8120
Zinc	16200	37800	32600	39900	35400	42700	29900	39100	29200

SD54 is the field duplicate of SD45. SD852 is the field duplicate of SD258. SD763 is the field duplicate of SD367. SD838 is the field duplicate of SD383.

# Table 7 MPK Data Summary for Sediment Samples MFLBC July, 1999 RÜTGERS Organics Corporation

Lab ID	Matrix	Sample ID:	QC Type	Percent Solids	_	% Fines	Mirex Result	Mirex Qualifier	Photomirex Result	Photomirex Qualifier	Kepone Result	Kepone Qualifier
L23745-1	Sediment	SD 403	Primary	81.20	0.40	14.0	ND	U	ND	U	ND	U
L23744-1	Sediment	SD 383	Primary	78.70	0.14	3.5	ND	U	ND	U	ND	U
L23744-2	Sediment	SD 838	Field Duplicate	79.53	0.18	4.3	ND	U	ND	U	ND	U
L23745-3	Sediment	SD 378	Primary	77.76	0.29	30.2	21.2	N	ND	υ	ND	U
L23770-1	Sediment	SD 367	Primary	77.11	0.23	7.8	380	D	ND	υ	ND	U
L23768-1	Sediment	SD 763	Field Duplicate	81.29	0.18	6.9	504	D	ND	U	ND	U
L23769-3	Sediment	SD 333	Primary	70.25	0.63	16.5	361	D	ND	Ū	ND	U
L23769-1	Sediment	SD 320	Primary	81.74	0.06	3.0	4.19	J	ND	U	ND	U
L23778-2	Sediment	SD 288	Primary	74.28	0.27	11.5	28	N	ND	U	ND	U
L23777-1	Sediment	SD 258	Primary	55.38	1.50	53.1	165		ND	U	ND	U
L23779-1	Sediment	SD 852	Field Duplicate	54.36	6.10	44.1	187		2.5	J	ND	U
L23789-1	Sediment	SD 235	Primary	60.98	1.06	46.4	4.9	J	ND	U	ND	U
L23789-4	Sediment	SD 218	Primary	47.13	2.60	50.5	4.91	J	ND	U	ND	U
L23815-2	Sediment	SD 209	Primary	62.54	1.38	36.5	29.4	N	ND	U	ND	U
L23816-2	Sediment	SD 150	Primary	55.38	2.25	11.8	23.7	N	ND	U	ND.	U
L23815-5	Sediment	SD 105	Field Duplicate	74.92	2.38	10.3	24.8	N	ND	U	ND	U
L23885-6	Sediment	SD 45	Primary	63.15	0.83	22.0	3.3	J	ND	U	ND	U
L23884-1	Sediment	SD 54	Field Duplicate	59.80	0.79	16.7	ND	Ų	ND	U	ND	U
L23885-1	Sediment	SD 19	Primary	71.94	0.27	19.3	ND	U	ND	U	ND	U

All units are in ug/kg (ppb).

Qualifiers are defined as follows:

- U = Analyte not detected Reporting limits Mirex:12.3 16.7 ppb; Photomirex: 13.5 23.3 ppb; Kepone: 43.6 75.7 ppb.
- J = Analyte detected at a concentration below the sample reporting limit.
- D = Compound is present; result reported from a secondary dilution of the sample extract.
- N = Tentatively Identified. Analyte presence strongly indicated but ion abundance ratio criteria are not met. This may be due to sample matrix effects.

Table 8
Surface Water Quality
MFLBC July, 1999
RÜTGERS Organics Corporation

Sample Numbers	River Miles	Temperature [°C]	Dissolved Oxygen [mg/l]	pH [s.u.]	Total Dissolved Solids [mg/l]	Conductivity [uS]	Stream Velocity [ft/s]	BOD-5 Day [mg/l]	Ammonia [mg/l]	Nitrite [mg/l]	Nitrate [mg/l]	Phosphorus [mg/l]	Total Suspended Solids [mg/l]
SW19	1.9	26.7	9.3	6.87	508	1038	0.62	3.38	0.2 U	0.1 U	0.338	0.326	1.5
SW45	4.4	26.6	9.9	7.91	534	1999	1.0	3.97	0.2 U	0.1 U	0.397	0.331	4.6
SW54	4.4	_			_	_		3.69	0.2 U	0.1 U	0.345	0.336	6.4
SW150	15.0	27.3	17.8	8.49	542	1072	0.30	3.95	0.2 U	0.1 U	1.04	0.797	3.1
SW209	20.9	30.1	13.7	7.18	736	1457	0.20	4.09	0.2 U	0.1 U	1.11	1.64	6.7
SW218	21.8	30.0	18.4	8.42	942	1847	0.30	3.37	0.2 U	0.1 U	1.16	2.81	4.8
SW235	23.5	24.3	8.8	7.82	1180	2360	0.30	6.99	0.2 U	0.1 U	1.96	4.92	6.3
SW258	25.8	23.8	8.2	7.85	1250	2440	0.56	4.89	0.2 U	0.1 U	2.8	6.19	9.4
SW288	28.8	25.2	8.0	7.95	1500	2960	0.30	5.52	0.2 U	0.1 U	5.56	12.1	6.4
SW320	32.0	24.6	7.8	8.14	713	1362	0.56	4.97	0.2 U	0.1 U	5.65	8.27	3.3
SW333	33.3	24.5	9.4	8.12	803	1578	0.67	5.61	0.2 U	0.1 U	9.31	8.03	3.3
SW367	36.7	26.8	8.6	7.95	1230	2420	0.48	5.05	0.2 U	0.1 U	10.3	11.9	3.0
SW378	37.7	27.0 ·	10.7	7.69	1300	2550	0.83	6.01	0.2 U <sup>'</sup>	0.1 U	11.7	13.2	3.1
SW383	38.3	29.2	15.9	8.35	387	776	0.30	7.2	0.2 U	0.1 U	0.148	0.111	17.9
SW838	38.3		-	-				7.47	0.2 U	0.1 U	0.109	0.105	3.4
SW403	40.3	28.2	13.6	8.33	282	552	N/A	5.9	0.2 U	0.1 U	0.72	0.188	9.7

SW54 is the field duplicate of SW45.

SW838 is the field duplicate of SW383.

N/A - not available

Temperature, Dissolved Oxygen, pH, Total Dissolved Solids, Conductivity, and Flow Velocity are field measurements by Davey Resource Group.

Collection Date: 08/23/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 40.30

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qua
01320	Hydra sp	10	96002	Helisoma anceps anceps	5
01801	Turbellaria	16 +	98200	Pisidium sp	+
03600	Oligochaeta	922			
04664	Helobdella stagnalis	2	No. 0	Quantitative Taxa: 25	Total Taxa: 44
04666	Helobdella triserialis	+	No (	Qualitative Taxa: 32	ICI: <b>10</b>
04686	Placobdella papillifera	+		ber of Organisms: 11:	
04935	Erpobdella punctata punctata	3 +	Nulli	ber of Organisms. 11.	31 Qual EPT: 5
)4962	Mooreobdella fervida	1 +			
5800	Caecidotea sp	6 +			
6201	Hyalella azteca	30 +			
06700	Crangonyx sp	+			
8230	Orconectes (Crokerinus) obscurus	+	·		
1200	Callibaetis sp	10 +			
.2501	Heptageniidae	+			
7200	Caenis sp	2			
1200	Calopteryx sp	+			
2001	Coenagrionidae	9 +			
3909	Boyeria vinosa	+			
8500	Libellula sp	+			
2700	Belostoma sp	+			
15300	Sigara sp	+			
2200	Cheumatopsyche sp	+			
3800	Hydroptila sp	+			
57400	Neophylax sp	+			
50900	Peltodytes sp	3 <b>+</b>			
3900	Laccophilus sp	+			
67800	Tropisternus sp	+ -			
8700	Dubiraphia sp	1		•	
74100	Simulium sp	+			
74501	Ceratopogonidae	8 +			
77130	Ablabesmyia rhamphe group	1			
77500	Conchapelopia sp	1 +			· ·
78200	Larsia sp	22 +			
78350	Meropelopia sp	2 +		•	
32730	Chironomus (C.) decorus group	1			
83840	Microtendipes pedellus group	2			
3 <b>4</b> 210	Paratendipes albimanus or P. duplicatus	71 +			
84450	Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	+ .			
84900	Zavreliella marmorata	1			
84960	Pseudochironomus sp	1			
86100	·	+			
95100	Physella sp	1			

Collection Date: 08/23/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 38.20

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qua
	Oligochaeta	. +			
	Placobdella papillifera	+			
08230	Orconectes (Crokerinus) obscurus	+			
11120	Baetis flavistriga	+			
11130	Baetis intercalaris	+		•	•
11200	Callibaetis sp	+			
21200	Calopteryx sp	+			
22300	Argia sp	+			
24900	Gomphus sp	+			
52200	Cheumatopsyche sp	+			i e
52440	Ceratopsyche slossonae	+			
52530	Hydropsyche depravata group	+			•
60900	Peltodytes sp	+			
65700	Anacaena sp	+			
67800	Tropisternus sp	+			
68708	Dubiraphia vittata group	+			
69400	Stenelmis sp	+		•	
71900	Tipula sp	+			
77500	Conchapelopia sp	+			
78401	Natarsia species A (sensu Roback, 1978)	+			
80410	Cricotopus (C.) sp	+			
80420	Cricotopus (C.) bicinctus	+		•	
80430	Cricotopus (C.) tremulus group	+			
81825	Rheocricotopus (Psilocricotopus) robacki	+			
82730	Chironomus (C.) decorus group	+,			
82820	Cryptochironomus sp	+			
84450	Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	+			
84460	Polypedilum (P.) fallax group	+			
84470	Polypedilum (P.) illinoense	+			
85800	Tanytarsus sp	+			ē.
87400	Stratiomys sp	+			
95100	Physella sp	+			
98600		+			

Qual EPT: 6

Number of Organisms: 0

Collection Date: 08/23/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 37.70

Taxa	· · · · · · · · · · · · · · · · · · ·		Taxa		
Code	Taxa	Quant/Qual	Code	Taxa	Quant/Qua
01801	Turbellaria	9 +	84470	Polypedilum (P.) illinoense	80 +
03360	Plumatella sp	+	85500	Paratanytarsus sp	40
03600	Oligochaeta	304	85625	Rheotanytarsus exiguus group	40
04962	Mooreobdella fervida	+	85814	Tanytarsus glabrescens group	40
05800	Caecidotea sp	+	87540	Hemerodromia sp	27 +
06700	Crangonyx sp	33 +	95100	Physella sp	288 +
11120	Baetis flavistriga	1	96900	Ferrissia sp	347 <b>+</b>
11200	Callibaetis sp	+		· · · · · · · · · · · · · · · · · · ·	
16700	Tricorythodes sp	4	No. Ç	Quantitative Taxa: 35	Total Taxa: 47
21200	Calopteryx sp	1 +		Qualitative Taxa: 31	ICI: <b>28</b>
22001	Coenagrionidae	+		-	
22300	Argia sp	7	INUIIII	per of Organisms: 3478	Qual EPT: 5
23909	Boyeria vinosa	1 +			
47600	Sialis sp	+			
52200	Cheumatopsyche sp	114 +			
52430	Ceratopsyche morosa group	3			
52440	Ceratopsyche slossonae	3 +			
52530	Hydropsyche depravata group	159 +			
58505	Helicopsyche borealis	+			
67800	Tropisternus sp	+			
68707	Dubiraphia quadrinotata	+			
69400	Stenelmis sp	3 +			
74100	Simulium sp	6			
77500	Conchapelopia sp	99 +			
77750	Hayesomyia senata or Thienemannimyia norena	+			
77800	Helopelopia sp	20 +			
78401	Natarsia species A (sensu Roback, 1978)	+			
78450	Nilotanypus fimbriatus	20			
80350	Corynoneura sp	16			
80410	Cricotopus (C.) sp	119			
80420	Cricotopus (C.) bicinctus	119 +			
80430	Cricotopus (C.) tremulus group	139 +			
81231	Nanocladius (N.) crassicornus or N. (N.) "rectinervis"	20			
81240	Nanocladius (N.) distinctus	40			
81825	Rheocricotopus (Psilocricotopus) robacki	617 +			
82141	Thienemanniella xena	580 +			
82730	Chironomus (C.) decorus group	20			
82820	Cryptochironomus sp	+	-		
84450	Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	40			
84460	Polypedilum (P.) fallax group	119 +			

Collection Date: 08/23/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 36.70

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qua
01801	Turbellaria	31 +	84460	Polypedilum (P.) fallax group	121
03360	Plumatella sp	1	84540	Polypedilum (Tripodura) scalae	
03600	Oligochaeta	93 +	84700	Stenochironomus sp	num group +
04935	Erpobdella punctata punctata	+	84750	Stictochironomus sp	+
04960	Mooreobdella sp	+	85500	Paratanytarsus sp	34
06700	Crangonyx sp	4 +	85625	Rheotanytarsus exiguus group	13
11130	Baetis intercalaris	4	85800	Tanytarsus sp	20
21200		11 +	87540	Hemerodromia sp	. 2
22001	Coenagrionidae	+	95100	Physella sp	17 +
22300	Argia sp	27		Ferrissia sp	100
23909	Boyeria vinosa	4 +		т стиони эр	
24900	Gomphus sp	+	No C	Quantitative Taxa: 35	Total Taxa: 51
	Libellula lydia	+		-	
47600	Sialis sp	1		Qualitative Taxa: 29	ICI: <b>32</b>
52200	Cheumatopsyche sp	850 +	Numl	oer of Organisms: 2196	Qual EPT: 3
52430	Ceratopsyche morosa group	17 +			
52440	Ceratopsyche slossonae	16			
	Hydropsyche depravata group	200 +			
	Peltodytes sp	+			
	Anacaena sp	+			
67800	Tropisternus sp	+			
	Helichus sp	· +			
	Ancyronyx variegata	1			
68708	Dubiraphia vittata group	10 +			
68901	Macronychus glabratus	15 +			
69225	Optioservus fastiditus	+			
69400	Stenelmis sp	42 +			
74501	Ceratopogonidae	+			e e
77500		45			
77750	Conchapelopia sp Hayesomyia senata or Thienemannimyia	7			
11130	norena	,			
77800	Helopelopia sp	53			
78401	Natarsia species A (sensu Roback, 1978)	+			,
78450	Nilotanypus fimbriatus	27			
80370	Corynoneura lobata	16			
81231	Nanocladius (N.) crassicornus or N. (N.)	13			
	"rectinervis"				
81270	Nanocladius (N.) spiniplenus	7			
81825	Rheocricotopus (Psilocricotopus) robacki	376 +			
82141	Thienemanniella xena	4			
83040	Dicrotendipes neomodestus	+			
83300	Glyptotendipes (G.) sp	7			
-	11L ( A A AL				

Collection Date: 08/24/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 33.30

Taxa		01/01	Taxa	Torre	Owner#lOve
Code	Taxa	Quant/Qual	Code	Taxa	Quant/Qua
01801	Turbellaria	56 +			
03360	Plumatella sp	+	•		
03600	Oligochaeta	3 +			
08230	Orconectes (Crokerinus) obscurus	+			
11130	Baetis intercalaris	245 +			
21200	Calopteryx sp	+		·	
30000	Plecoptera	2			
52200	Cheumatopsyche sp	402 +			
52430	Ceratopsyche morosa group	251 +			
52450	Ceratopsyche sparna	13 +			
52530	Hydropsyche depravata group	492 +			
63300	Hydroporus sp	+			
67800	Tropisternus sp	+			
68601	Ancyronyx variegata	8 +			•
68708	Dubiraphia vittata group	+			
68901	Macronychus glabratus	2			
69225	Optioservus fastiditus	+			
69400	Stenelmis sp	16 +			
70600	Antocha sp	9 +			
77500	Conchapelopia sp	4			
78450	Nilotanypus fimbriatus	10			
80204	Brillia flavifrons group	7			
80370	Corynoneura lobata	79			
80420	Cricotopus (C.) bicinctus	4			
81650	Parametriocnemus sp	15			
81690	Paratrichocladius sp	4			
81825	Rheocricotopus (Psilocricotopus) robacki	59			
82141	Thienemanniella xena	13			
84450	Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	140			
84460	Polypedilum (P.) fallax group	11			
85500	Paratanytarsus sp	4			
85625	Rheotanytarsus exiguus group	33			
85800	Tanytarsus sp	4			
85814	Tanytarsus glabrescens group	26			
86100	Chrysops sp	+		•	
96900	Ferrissia sp	4			

No. Quantitative Taxa: 28

No. Qualitative Taxa: 18

ICI: 40

Number of Organisms: 1916

Qual EPT: 5

Collection Date: 08/24/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 32.00

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa		<u> </u>	uant/Qual
							- Quan
01801	Turbellaria	11	84520	Polypedilum (Tripodu		•	+
03360	Plumatella sp	+	84540	Polypedilum (Tripodu	ıra) scalaenum	group	+
03600	Oligochaeta	70 +	84700	Stenochironomus sp			+
05800	Caecidotea sp	1	84750	Stictochironomus sp			+
06700	Crangonyx sp	2 +	85230	Cladotanytarsus man	cus group		+
08230	Orconectes (Crokerinus) obscurus	+	85500	Paratanytarsus sp			80
08601	Hydracarina	1	85625	Rheotanytarsus exigu			80
11130	Baetis intercalaris	32 +	85821	Tanytarsus glabresce			642
16700	Tricorythodes sp	5	85840	Tanytarsus guerlus gr	roup		80
1,7200	Caenis sp	39	87400	Stratiomys sp			+
21200	Calopteryx sp	26 <b>+</b>	87540	Hemerodromia sp			2
22001	Coenagrionidae	• +	96900	Ferrissia sp			18
22300	Argia sp	1					
23804	Basiaeschna janata	+	No. Ç	Quantitative Taxa:	33	Total Taxa	52
44501	Corixidae	+	No. Q	Qualitative Taxa:	29	ICI:	40
52200	Cheumatopsyche sp	196 +	Numl	er of Organisms:	1893	Qual EPT:	6
52430	Ceratopsyche morosa group	5 +	1 (dill)	oci oi oiguinoino.	1000	Quarti.	U
52450	Ceratopsyche sparna	+					
52530	Hydropsyche depravata group	18 +					
58505	Helicopsyche borealis	. +					
67800	Tropisternus sp	+					
68025	Ectopria sp	+					
68601	Ancyronyx variegata	31 +					
68700	Dubiraphia sp	14					
68901	Macronychus glabratus	1 +					
69400	Stenelmis sp	5 +	*				
77500	Conchapelopia sp	16		•			
77750	Hayesomyia senata or Thienemannimyia norena	+					
77800	Helopelopia sp	64					
78450	Nilotanypus fimbriatus	132					
80370	Corynoneura lobata	17		•			
80410	Cricotopus (C.) sp	16					
81231	Nanocladius (N.) crassicornus or N. (N.) "rectinervis"	64					
81825	Rheocricotopus (Psilocricotopus) robacki	96					
82820	Cryptochironomus sp	+					
83040	Dicrotendipes neomodestus	16					
84210	Paratendipes albimanus or P. duplicatus	+					
84450	Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	32					
84460	Polypedilum (P.) fallax group	80					
84470	Polypedilum (P.) illinoense	+					

Collection Date: 08/24/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 28.80

Taxa			Taxa				
Code	Taxa	Quant/Qual	Code	Taxa		Qι	ant/Qual
01801	Turbellaria	4 +	86100	Chrysops sp			+
03360	Plumatella sp	1	89501	Ephydridae			1
03600	Oligochaeta	5	96900	Ferrissia sp			17 +
06201	Hyalella azteca	+					
06700	Crangonyx sp	1 +	No. C	Quantitative Taxa:	34 To	otal Taxa:	43
08230	Orconectes (Crokerinus) obscurus	+	No C	- Qualitative Taxa:	23	ICI:	40
11130	Baetis intercalaris	22 +		per of Organisms:			
17200	Caenis sp	18	Mulli	ber of Organisms.	1201 (	Qual EPT:	4
21200	Calopteryx sp	+					
22001	Coenagrionidae	2 +					
22300	Argia sp	32 +					
52200	Cheumatopsyche sp	70 +					
52430	Ceratopsyche morosa group	1 +					
52530	Hydropsyche depravata group	5 +					
63300	Hydroporus sp	+					
68601	Ancyronyx variegata	135 +					
68708	Dubiraphia vittata group	1 +					
68901	Macronychus glabratus	52 <b>+</b>					
69400	Stenelmis sp	5 +					
71900	Tipula sp	+					
77355	Clinotanypus pinguis	+					
77500	Conchapelopia sp	34		•			
77750	Hayesomyia senata or Thienemannimyia norena	80					
77800	Helopelopia sp	11					
78401	Natarsia species A (sensu Roback, 1978)	+					
78450	Nilotanypus fimbriatus	4					
81231	Nanocladius (N.) crassicornus or N. (N.) "rectinervis"	10					
81240	Nanocladius (N.) distinctus	29		•			
81650	Parametriocnemus sp	10					
81825	Rheocricotopus (Psilocricotopus) robacki	10					
82141	Thienemanniella xena	4 +					
84020	Parachironomus carinatus	19					
84450	Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	38					
84460	Polypedilum (P.) fallax group	10					
84520	Polypedilum (Tripodura) halterale group	+					
85500	Paratanytarsus sp	67					
85625	Rheotanytarsus exiguus group	19					
85800	Tanytarsus sp	10					
85821	Tanytarsus glabrescens group sp 7	516					
85840	Tanytarsus guerlus group	38					

Collection Date: 08/24/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 25.80

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa		Qı	uant/Qual
03600	Oligochaeta	63 +	95100	Physella sp			+
04686	Placobdella papillifera	+	96900	Ferrissia sp			101 +
06201	Hyalella azteca	+	98600	Sphaerium sp			+
11130	Baetis intercalaris	8 +					
13400	Stenacron sp	1 +	No. C	) Ouantitative Taxa:	30	Total Taxa:	44
17200	Caenis sp	18		- Dualitative Taxa:		ICI:	
21200	Calopteryx sp	18		~			
22001	Coenagrionidae	+	Num	oer of Organisms:	1879	Qual EPT:	4
25510	Stylogomphus albistylus	+					
45300	Sigara sp	+					
52200	Cheumatopsyche sp	267 +					
52530	Hydropsyche depravata group	1					
57900	Pycnopsyche sp	+					
60900	Peltodytes sp	+					
63300	Hydroporus sp	+					
68601	Ancyronyx variegata	9					
68901	Macronychus glabratus	17					
69400	Stenelmis sp	3 →					
77500	Conchapelopia sp	46					
77750	Hayesomyia senata or Thienemannimyia norena	139 +					
77800	Helopelopia sp	70 <b>+</b>					
78450	Nilotanypus fimbriatus	38					
80370	Corynoneura lobata	8					
80410	Cricotopus (C.) sp	90					
81631	Parakiefferiella n.sp 1	45					
81632	Parakiefferiella n.sp 2	90					
81825	Rheocricotopus (Psilocricotopus) robacki	105					
82141	Thienemanniella xena	4					
82730	Chironomus (C.) decorus group	+					
82820	Cryptochironomus sp	+					
83040	Dicrotendipes neomodestus	121					
84210	Paratendipes albimanus or P. duplicatus	+					
84450	Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	60					
84460	Polypedilum (P.) fallax group	136					
84540	Polypedilum (Tripodura) scalaenum group	30					
85500	Paratanytarsus sp	30					
85625	Rheotanytarsus exiguus group	30					
85800	Tanytarsus sp	30					
85821	Tanytarsus glabrescens group sp 7	241					
85840	Tanytarsus guerlus group	60					
	Atherix lantha						

Collection Date: 08/25/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 23.50

Taxa			Taxa		
Code	Taxa	Quant/Qual	Code	Taxa	Quant/Qual
01801	Turbellaria	2			
03360	Plumatella sp	1	No. Quar	ntitative Taxa: 34	Total Taxa: 40
03600	Oligochaeta	13	-	·	ICI: <b>38</b>
06201	Hyalella azteca	1	_		
06700	Crangonyx sp	+	Number	of Organisms: 2166	Qual EPT: 4
08230	Orconectes (Crokerinus) obscurus	+			
08601	Hydracarina	8			
11130	Baetis intercalaris	99 +	•		
21200	Calopteryx sp	1 +			
45100	Palmacorixa sp	+			
45900	Notonecta sp	+			
50804	Lype diversa	1			
52200	Cheumatopsyche sp	94 +			
52430	Ceratopsyche morosa group	85 +			
52530	Hydropsyche depravata group	15 +			
53800	Hydroptila sp	29			
60800	Haliplus sp	+			
68901	Macronychus glabratus	2.			
69400	Stenelmis sp	+			
70600	Antocha sp	2			
77500	Conchapelopia sp	19			
77750	Hayesomyia senata or Thienemannimyia norena	56			
78450	Nilotanypus fimbriatus	48			
80370	Corynoneura lobata	8			
80410	Cricotopus (C.) sp	150	٠		
80430	Cricotopus (C.) tremulus group	37			
81231	Nanocladius (N.) crassicornus or N. (N.) "rectinervis"	19			
81270	Nanocladius (N.) spiniplenus	37			
81632	Parakiefferiella n.sp 2	300 +			
81690	Paratrichocladius sp	56			
81825	Rheocricotopus (Psilocricotopus) robacki	224 +			
83040	Dicrotendipes neomodestus	19			
84450	Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	56			
84460	Polypedilum (P.) fallax group	37			
85500	Paratanytarsus sp	75			
85625	Rheotanytarsus exiguus group	93			
85821	Tanytarsus glabrescens group sp 7	561			
86401	Atherix lantha	1 +			
87540	Hemerodromia sp	.5			4
96900	Ferrissia sp	12			

Collection Date: 08/25/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 21.80

Taxa	_	0 (0 -	Taxa		
Code	Taxa	Quant/Qual	Code	Taxa	Quant/Qua
03360	Plumatella sp	1	84460	Polypedilum (P.) fallax group	8 +
03600	Oligochaeta	4 +	85500	Paratanytarsus sp	33
05800	Caecidotea sp	5 +	85625	Rheotanytarsus exiguus group	150
08230	Orconectes (Crokerinus) obscurus	+	85802	Tanytarsus curticornis group	8
08601	Hydracarina	4	85821	Tanytarsus glabrescens group sp	7 248
11130	Baetis intercalaris	177 +	85840	Tanytarsus guerlus group	8 +
16700	Tricorythodes sp	1	86401	Atherix lantha	1 +
17200	Caenis sp	+	87540	Hemerodromia sp	5
21200	Calopteryx sp	9 +	95100	Physella sp	+
23804	Basiaeschna janata	+	96900	Ferrissia sp	33
45100	Palmacorixa sp	+	99100	Pyganodon grandis	+
45400	Trichocorixa sp	+			
50804	Lype diversa	20	No. C	Quantitative Taxa: 39	Total Taxa: 51
52200	Cheumatopsyche sp	855 +		Qualitative Taxa: 27	ICI: <b>44</b>
52430	Ceratopsyche morosa group	733 +		-	
52440	Ceratopsyche slossonae	+	Numi	per of Organisms: 2739	Qual EPT: 6
52530	Hydropsyche depravata group	27 +			
53800	Hydroptila sp	13			
63300	Hydroporus sp	+			
63900	Laccophilus sp	+			
67800	Tropisternus sp	+			
68130	Helichus sp	1			
68601	Ancyronyx variegata	4 +			
68901	Macronychus glabratus	27 +			
69400	Stenelmis sp	24 +			
70600	Antocha sp	9			
77500	Conchapelopía sp	42			
77750	Hayesomyia senata or Thienemannimyia norena	66 +			
78450	Nilotanypus fimbriatus	18			
80370	Corynoneura lobata	4			
80410	Cricotopus (C.) sp	17			
80420	Cricotopus (C.) bicinctus	17			
81465	Orthocladius (O.) carlatus	8			
81632	Parakiefferiella n.sp 2	17 +			•
81825	Rheocricotopus (Psilocricotopus) robacki	58			
82101	Thienemanniella n.sp 1	5			
82141	Thienemanniella xena	. 13			
82200	Tvetenia bavarica group	8			
83820	Microtendipes "caelum" (sensu Simpson & Bode, 1980)	+			
84450	Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	58			

Collection Date: 08/25/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 20.90

Taxa	T	0	Taxa	T	^	
Code	Taxa	Quant/Qual	Code	Taxa	Qt	ıant/Qua
01801	Turbellaria	17 +	83051	Dicrotendipes simpsoni		6
03360	Plumatella sp	1	83300	Glyptotendipes (G.) sp		6
03600	Oligochaeta	90	84210	Paratendipes albimanus or P. du	plicatus	18
04653	Glossiphonia complanata	1	84300	Phaenopsectra obediens group		12
04666	Helobdella triserialis	1	84450	Polypedilum (P.) "convictum" (se	nsu	12
05800	Caecidotea sp	+		Simpson and Bode, 1980)		
06201	Hyalella azteca	+	84460	Polypedilum (P.) fallax group		18
08230	Orconectes (Crokerinus) obscurus	1 +	84470	Polypedilum (P.) illinoense		6 +
11130	Baetis intercalaris	1 +	84520	Polypedilum (Tripodura) halteral		6
13400	Stenacron sp	1	84540	Polypedilum (Tripodura) scalaen	um group	68
16700	Tricorythodes sp	1	85500	Paratanytarsus sp		62
17200	Caenis sp	26	85625	Rheotanytarsus exiguus group		6
21200	Calopteryx sp	6 +	85800	Tanytarsus sp		6
22001	Coenagrionidae	4 +	85802	Tanytarsus curticornis group		6
22300	Argia sp	4	85821	Tanytarsus glabrescens group sp	7	6
45900	Notonecta sp	+	85840	Tanytarsus guerlus group		18
52200	Cheumatopsyche sp	12 +	94400	Fossaria sp		+
52430	Ceratopsyche morosa group	+	95100	Physella sp		14 +
52530	Hydropsyche depravata group	+	96900	Ferrissia sp		9 +
53800	Hydroptila sp	3			<del></del>	
54200	Orthotrichia sp	2	No. Q	Quantitative Taxa: 46	Total Taxa:	60
60300	Dineutus sp	+	No. C	Qualitative Taxa: 28	ICI:	26
65800	Berosus sp	2		_		
67800	Tropisternus sp	+	Mulli	per of Organisms: 853	Qual EPT:	4
68130	Helichus sp	+				
68601	Ancyronyx variegata	12 +				
68707	Dubiraphia quadrinotata	+				
68708	Dubiraphia vittata group	60 <b>+</b>				
68901	Macronychus glabratus	11 +				
69400	Stenelmis sp	+				
71100	Hexatoma sp	+				
71900	Tipula sp	+				
74100	Simulium sp	2				
74501	Ceratopogonidae	4				
77120	Ablabesmyia mallochi	6				
77500	Conchapelopia sp	25 +				
77750	Hayesomyia senata or Thienemannimyia	123 +				
	norena					
77800	Helopelopia sp	117				
78140	Labrundinia pilosella	4				
80510	Cricotopus (Isocladius) sylvestris group	+				
83002	Dicrotendipes modestus	6				
83040	Dicrotendipes neomodestus	31				
	overmip or noonsowers					

Collection Date: 08/25/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 15.00

Taxa			Taxa		
Code	Taxa	Quant/Qual	Code	Taxa	Quant/Qual
01320	Hydra sp	12		Simpson and Bode, 1980)	
03360	Plumatella sp	+	84470	Polypedilum (P.) illinoense	+
03600	Oligochaeta	+	84540	Polypedilum (Tripodura) scalaem	um group +
04685	Placobdella ornata	1	85625	Rheotanytarsus exiguus group	962 +
05800	Caecidotea sp	+	85800	Tanytarsus sp	9
06201	Hyalella azteca	+	85821	Tanytarsus glabrescens group sp	7 18 +
06700	Crangonyx sp	+	85840	Tanytarsus guerlus group	9
08230	Orconectes (Crokerinus) obscurus	+	86401	Atherix lantha	1
08601	Hydracarina	8	95100	Physella sp	+
11130	Baetis intercalaris	634 +	96900	Ferrissia sp	43 <b>+</b>
11670	Procloeon irrubrum	+	98600	Sphaerium sp	+
12200	Isonychia sp	128 +			
13400	Stenacron sp	+	No. C	Quantitative Taxa: 26	Total Taxa: 52
13561	Stenonema pulchellum	8		Qualitative Taxa: 36	ICI: <b>44</b>
17200	Caenis sp	10 +		-	
21200	Calopteryx sp	+	Num	per of Organisms: 2817	Qual EPT: 6
23909	Boyeria vinosa	+			
42700	Belostoma sp	+			
45300	Sigara sp	+			
47600	Sialis sp	+			
52200	Cheumatopsyche sp	197 +			
52430	Ceratopsyche morosa group	537			
52530	Hydropsyche depravata group	20			
52540	Hydropsyche dicantha	43			
63300	Hydroporus sp	+,			
67700	Paracymus sp	+			
68601	Ancyronyx variegata	+			
68708	Dubiraphia vittata group	+			
68901	Macronychus glabratus	32 +			
69400	Stenelmis sp	1 +			
74100	Simulium sp	15			
77120	Ablabesmyia mallochi	+			
77500	Conchapelopia sp	18 +			
77750	Hayesomyia senata or Thienemannimyia norena	+			
77800	Helopelopia sp	+			
78401	Natarsia species A (sensu Roback, 1978)	+			
78450	Nilotanypus fimbriatus	21			
80370	Corynoneura lobata	8			
80410	Cricotopus (C.) sp	+			
81825	Rheocricotopus (Psilocricotopus) robacki	46			
82101	Thienemanniella n.sp 1	8			
84450	Polypedilum (P.) "convictum" (sensu	28			

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Taxa	<u></u>		Taxa				
Code	Taxa	Quant/Qual	Code	Taxa		Quant	/Qual
00653	Eunapius fragilis	+		Simpson and Bode, 19	(80)		
01801	Turbellaria	35 +	84470	Polypedilum (P.) illino	•		+
03360	Plumatella sp	1	84540	Polypedilum (Tripodu		32	
03600	Oligochaeta	48	84750	Stictochironomus sp			+
05800	Caecidotea sp	+	85500	Paratanytarsus sp		95	
08601	Hydracarina	25	85625	Rheotanytarsus exigui	is group	410	
11130	Baetis intercalaris	1 +	85752	Sublettea coffmani	•	32	
12200	Isonychia sp	13 +	85814	Tanytarsus glabrescen	ıs group	694	+
13400	Stenacron sp	4	85840	Tanytarsus guerlus gr		158	
13561	Stenonema pulchellum	7	86401	Atherix lantha			+
13590	Stenonema vicarium	11	95100	Physella sp			+
16700	Tricorythodes sp	3	96900	Ferrissia sp		288	+
17200	Caenis sp	129 +	98001	Sphaeriidae		. 9	
18600	Ephemera sp	2 +					
21200	Calopteryx sp	1 +	No. C	uantitative Taxa:	36 Total	Taxa: 54	
21300	Hetaerina sp	+		_	35	ICI: <b>36</b>	
22001	Coenagrionidae	+					
22300	Argia sp	1	Num	per of Organisms:	5225 Qual	EPT: 9	
24900	Gomphus sp	+					
47600	Sialis sp	+				·	
48410	Corydalus cornutus	+					
52200	Cheumatopsyche sp	1081 +					
52430	Ceratopsyche morosa group	138 +					
52530	Hydropsyche depravata group	+					
52540	Hydropsyche dicantha	48 +					
53800	Hydroptila sp	+					
60300	Dineutus sp	+					
68601	Ancyronyx variegata	18					
68708	Dubiraphia vittata group	3 <b>+</b>					
68901	Macronychus glabratus	34 +					
70600	Antocha sp	9 +					
77750	Hayesomyia senata or Thienemannimyia norena	568 +					
77800	Helopelopia sp	+					
78650	Procladius sp	+					
80410	Cricotopus (C.) sp	32					
81240	Nanocladius (N.) distinctus	32					
81825	Rheocricotopus (Psilocricotopus) robacki	158					
82730	Chironomus (C.) decorus group	+					
82820	Cryptochironomus sp	+				•	
83040	Dicrotendipes neomodestus	158 +					
84060	Parachironomus pectinatellae	32					
84450	Polypedilum (P.) "convictum" (sensu	915 +			•		
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	Taxa			Taxa		
1		Taxa	Quant/Qual		Taxa	Quant/Qual
1   1   1   1   1   1   1   1   1   1	01801	Turbellaria			Paratanytarcus en	
1					•	
05000         Cacidatea ap         1 + 85821         Tanytarsus glabrascens group sp 7         225           06700         Crungonyx sp         + 85840         Tanytarsus guerhus group         80           11130         Bedesis intercalaris         23 + 95907         Ferrissia sp         218 + 1           12200         Somychia sp         23 + 7000         Ferrissia sp         218 + 1           12200         Semacron sp         4 + 7000         No. Qualitative Taxa: 36         Total Taxa: 49           13551         Semocma valchellum         6 + 7000         No. Qualitative Taxa: 35         ICI: 42           13590         Semocma valchellum         2         No. Qualitative Taxa: 35         ICI: 42           13590         Semocma valchellum         2         No. Qualitative Taxa: 35         ICI: 42           13590         Semocma valchellum         2         No. Qualitative Taxa: 35         ICI: 42           13590         Divendes sp         30         + 4         4		<u>.</u>			,	
12   12   13   14   15   15   15   15   15   15   15		<del>-</del>			••	
1		•			• •	
1110   Bacis intercalarls		- , ,				
12400   Sonychia sp   23 +		·	23 +			
13400         Stenorens pubellum         6 + No. Quantitative Taxa: 36         Total Taxa: 49           13510         Stenomena vicarium         2         No. Qualitative Taxa: 35         ICI: 42           16700         Tricorythodes sp         30 + Number of Organisms: 2975         Qual EPT: 10           17200         Caenis sp         30 + Pace of Organisms: 2975         Qual EPT: 10           18600         Ephemera sp         4 + Pace of Organisms: 2975         Qual EPT: 10           18600         Caenis sp         4 + Pace of Organisms: 2975         Qual EPT: 10           25300         Caloperys sp         1 + Pace of Organisms: 2975         Qual EPT: 10           25300         Caloperys sp         1 + Pace of Organisms: 2975         Qual EPT: 10           25300         Caloperys sp         1 + Pace of Organisms: 2975         Qual EPT: 10           25300         Caloperys sp         1 + Pace of Organisms: 2975         Qual EPT: 10           25300         Caloperys sp         1 + Pace of Organisms: 2975         Qual EPT: 10           25300         Caloperys sp         1 + Pace of Organisms: 2975         Qual EPT: 10           25300         Nigonia serriconis         1 + Pace of Organisms: 2975         Qual EPT: 10           25400         Nigonia serriconis         1 + Pace of Organis	12200		23 +			
13561   Slenonema pulchellum	13400	•	4 +	No. C	Quantitative Taxa: 36	Total Taxa: 49
13590   Stenonema vicarium   2	13561		6 <b>+</b>		-	
Trecorptiones sp   30	13590	•	2		_	
17200         Caenis sp         30         +           18600         Ephemera sp         +           21200         Calopteryx sp         1         +           23300         Ophiogomphus sp         +           47600         Stalis sp         +           48620         Nigronia serricornis         +           52200         Cheunatopsyche sporosa group         449           52330         Ibydropsyche depravata group         71           52530         Ibydropsyche depravata group         47           52530         Ibydropsyche dicantha         42 +           67700         Paracymus sp         +           67800         Tropisterus sp         +           67800         Tropisterus sp         +           68701         Ancyronyx variegta         16           68702         Macronychus glabratus         16           69400         Stenelmis sp         9 +           77100         Albabesmyia mallochi         +           77110         Ablabesmyia mallochi         +           7710         Hayesomyia senata         140           7170         Hayesomyia senata         140           7710         Hayesomyia mallochi <td>16700</td> <td>Tricorythodes sp</td> <td>30</td> <td>Num</td> <td>per of Organisms: 2975</td> <td>Qual EPT: 10</td>	16700	Tricorythodes sp	30	Num	per of Organisms: 2975	Qual EPT: 10
18600         Ephemera sp         +           21200         Calopteryx sp         1         +           25300         Ophiogomphus sp         +         +           46620         Silais sp         +         +           52200         Cheumatopsyche sp         795         +           52430         Ceratopsyche morosa group         149         +           52530         Hydropsyche dicantha         42         +           55900         Ocecitis sp         8         +           67700         Paracymus sp         +         +           67800         Topisternus sp         +         +           68010         Ancronyax variegata         1         +           68011         Macronychus glabratus         16         +           68010         Macronychus glabratus         16         +           68011         Macronychus glabratus         16         +           68010         Alobesmyia mallochi         +         +           71700         Ablabesmyia mallochi         +         +           71800         Alobesmyia senata         140         +           71801         Helopelopia sp         35         -	17200	,	30 +			
21200         Clopteryx sp         +           25300         Ophogomphus sp         +           47600         Sialis sp         +           18620         Nigronia serricornis         +           52200         Cheumatopsyche sp         795           52301         Ceratopsyche morosa group         149           52502         Hydropsyche depravata group         71           52504         Hydropsyche dicantha         42           59500         Oecetis sp         8           67801         Tropisternus sp         +           68001         Ancyronyx variegata         1           68001         Ancyronyx variegata         1           68901         Macronychus glabratus         16           68901         Matocha sp         3           71000         Antocha sp         3           71100         Albabesmyia mallochi         +           71700         Hopedopia sp         35           81813         Orthocladius (Symposiocladius) lignicola         16           81800         Orthocladius (Symposiocladius) lignicola         16           81810         Orthocladius (Symposiocladius) lignicola         16           81820         Typtochir	18600	-	+			
25300         Ophiogomphus sp         +           47600         Stalis sp         +           48620         Nigronia serricornis         +           52200         Cheumatopsyche sp         795         +           52330         Ceratorsyche morosa group         71 +         +           52501         Hydropsyche dicantha         42         +           59500         Oceetis sp         8         -           67700         Paracymus sp         +         -           67800         Topisterms sp         +         -           68010         Ancyronyx variegata         1         -           68011         Macronychus glabratus         16         -           68010         Macronychus glabratus         16         -           68010         Macronychus glabratus         16         -           68010         Macronychus glabratus         16         -           71000         Alokabayia mallochi         +         -           71100         Alokabesnyia mallochi         +         -           71710         Alokabesnyia mallochi         +         -           81810         O'ribocladius (Symposiocladius) lignicola         16         <	21200	· •	1 +			
47600         Stalis sp         +           48620         Nigronia serricornis         +           52200         Cheumatopsyche sp         795 +           52430         Ceratopsyche morosa group         14 9           52530         Hydropsyche dicantha         42 +           59500         Oecetis sp         8           67701         Paracymus sp         +           67800         Tropisternus sp         +           68601         Ancyronyx variegata         1           68602         Maeronychus glabratus         16           69400         Stenelmis sp         9           70600         Antocha sp         3           77120         Ablabesmyia mallochi         +           77500         Conchapelopia sp         35           81530         O'thocladius (Symposiocladius) lignicola         16           81690         Paratrichocladius Sp         +           82201         Tetenia discoloripes group         +           82202         Tytenia discoloripes group         +           82800         Cryptachironomus sp         16           81000         Dicrotendipes neomodestus         48           8400         Dicrotendipes neomodestu	25300	• •	+			
48620         Nigronia serricornis         +           52200         Cheumatopsyche sp         795         +           52301         Ceratopsyche morosa group         149         +           52530         Hydropsyche depravata group         71         +           52540         Hydropsyche deicantha         42         +           67700         Paracymus sp         +           67800         Topisterrus sp         +           68011         Ancyronyx variegata         1           68012         Macronychus glabratus         16           68013         Macronychus glabratus         16           69400         Stenelmis sp         9           70600         Alolacha sp         3           707100         Ablabesmyia mallochi         +           717100         Hologelopia sp         35           717101         Hayesomyia senata         140           81690         Paratrichocladius (Symposiocladius) lignicola         16           81691         Paratrichocladius sp         +           82220         Tytenia discoloripes group         +           83040         Dicrotendipes neomodestus         48           8400         Polypedilum (P) "conv	47600		÷			
52200         Cheumatopsyche sp         795         +           52430         Ceratopsyche morosa group         149         +           52530         Hydropsyche depravata group         71         +           52540         Hydropsyche dicantha         42         +           57700         Paracymus sp         +           67800         Topisternus sp         +           68014         Ancyronyx variegata         1           68708         Dubiraphia vittata group         +           68901         Macronychus glabratus         16           69400         Stenelmis sp         9           70601         Antocha sp         3           70700         Alabesmyia mallochi         +           77740         Hayesonnyia senata         140           81530         Orthocladius (Symposiocladius) lignicola         16           81690         Paratrichocladius sp         3           82220         Tetenia discoloripes group         +           82300         Dicrotendipes neomodestus         48           83000         Dicrotendipes neomodestus         48           84000         Dicrotendipes nand Bode, 1980)	48620	•	+			
52430         Ceratopsyche morosa group         149         +           52530         Hydropsyche depravata group         71         +           52540         Hydropsyche dicantha         42         +           59500         Oecetis sp         8         -           67700         Paracymus sp         +         -           67800         Tropisternus sp         +         -           68601         Ancyronyx variegata         1         -           68901         Macronychus glabratus         16         -           69901         Macronychus glabratus         16         -           7900         Stenelmis sp         9         +           70100         Anlocha sp         3         +           7110         Holabesmyia mallochi         +           71700         Hayesomyia senata         140         +           71800         Helopelopia sp         35         -           81530         Orthocladius (Symposiocladius) lignicola         16         -           81690         Paratrichocladius sp         +         -           82101         Thienemanniella xena         +         -           82200         Cryptochironomus sp <td>52200</td> <td>•</td> <td>795 <b>+</b></td> <td></td> <td></td> <td></td>	52200	•	795 <b>+</b>			
52530         Hydropsyche depravata group         71         +           52540         Hydropsyche dicantha         42         +           59500         Oecetis sp         8           67700         Paracymus sp         +           67801         Tropisternus sp         +           68001         Ancyronyx variegata         1           68701         Mubiraphia vittata group         +           68702         Stenelmis sp         9           70601         Macronychus glabratus         16           70602         Stenelmis sp         9           70703         Stenelmis sp         3           70710         Hayesomyia senata         140           71710         Hayesomyia senata         140           71800         Helopelopia sp         35           81530         Orthocladius (Symposicalatius) lignicala         16           81690         Paratrichocladius sp         +           82141         Thienemanuiella xena         +           82220         Tvetenia discoloripes group         +           8280         Cryptochironomus sp         16           81000         Dicrotendipes neomodestus         45           81000	52430	,	149 +			
52540         Hydropsyche dicantha         42 +           59500         Oecetis sp         8           67700         Paracymus sp         +           67800         Tropisternus sp         +           68011         Ancyronyx variegata         1           68708         Dubiraphia vittata group         +           68901         Macronychus glabratus         16           69400         Stenelmis sp         9           70601         Antocha sp         3           71720         Ablabesmyia mallochi         +           77300         Conchapelopia sp         35           7740         Hayesomyia senata         140 +           81630         Orthocladius (Symposiocladius) lignicola         16           81630         Paratrichocladius sp         +           82241         Thienemanniella xena         +           82220         Tvetenia discoloripes group         +           82300         Cryptochironomus sp         16 +           83040         Dicrotendipes neomodestus         48 +           84450         Polypedilum (P.) "convictum" (sensu         450 +           85mpson and Bode, 1980)	52530		71 +			
55500         Geceits sp         8           67700         Paracymus sp         +           67800         Tropisternus sp         +           68011         Ancyronyx variegata         1           68070         Dubiraphia vittata group         +           68901         Macronychus glabratus         16           69901         Macronychus glabratus         16           79000         Stenelmis sp         9           791100         Ablabesmyia mallochi         +           79110         Hayesomyia senata         140         +           79100         Helopelopia sp         35         -           81530         Orthocladius (Symposiocladius) lignicola         16         -           81211         Thienemanniella xena         +         -           82220         Tvetenia discoloripes group         +           83040         Cryptochironomus sp         16         +           8450         Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)         +	52540		42 +			
67700         Paracymus sp         +           67800         Tropisternus sp         +           68601         Ancyronyx variegata         1           68708         Dubiraphia vittata group         +           68901         Macronychus glabratus         16           69400         Stenelmis sp         9           70600         Antocha sp         3           7120         Ablabesmyia mallochi         +           77800         Conchapelopia sp         35           77740         Hayesomyia senata         140           81530         Orthocladius (Symposiocladius) lignicola         16           81690         Paratrichocladius sp         +           82211         Thienemanniella xena         +           82220         Tvetenia discoloripes group         +           83040         Dicrotendipes neomodestus         48           84450         Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)         +	59500		8			
67800       Tropisternus sp       +         68011       Ancyronyx variegata       1         68708       Dubiraphia vittata group       +         68901       Macronychus glabratus       16         69400       Stenelmis sp       9         70600       Antocha sp       3         77120       Ablabesmyia mallochi       +         77500       Conchapelopia sp       35         77740       Hayesomyia senata       140         77800       Helopelopia sp       35         81530       Orthocladius (Symposiocladius) lignicola       16         81690       Paratrichocladius sp       +         82211       Thienemanniella xena       +         82220       Tvetenia discoloripes group       +         82820       Cryptochironomus sp       16       +         83040       Dicrotendipes neomodestus       48       +         84450       Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)       +	67700		+			
68601       Ancyronx variegata       1         68708       Dubiraphia vittata group       +         68901       Macronychus glabratus       16         69400       Stenelmis sp       9         70600       Antocha sp       3         77120       Ablabesmyia mallochi       +         77500       Conchapelopia sp       35         77740       Hayesomyia senata       140         77800       Helopelopia sp       35         81530       Orthocladius (Symposiocladius) lignicola       16         81690       Paratrichocladius sp       +         82141       Thienemanniella xena       +         82220       Tvetenia discoloripes group       +         82820       Cryptochironomus sp       16         83040       Dicrotendipes neomodestus       48         84450       Polypedilum (P.) "convictum" (sensu Sumpson and Bode, 1980)       450	67800		+			
68708       Dubiraphia vittata group       +         68901       Macronychus glabratus       16         69400       Stenelmis sp       9         70600       Antocha sp       3         77120       Ablabesmyia mallochi       +         77500       Conchapelopia sp       35         77740       Hayesomyia senata       140         81530       Orthocladius (Symposiocladius) lignicola       16         81690       Paratrichocladius sp       +         82214       Thienemanniella xena       +         82220       Tvetenia discoloripes group       +         82820       Cryptochironomus sp       16         83040       Dicrotendipes neomodestus       48         84450       Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	68601	· · · · · · · · · · · · · · · · · · ·				
69400       Stenelmis sp       9       +         70600       Antocha sp       3       +         77120       Ablabesmyia mallochi       +         77500       Conchapelopia sp       35         77740       Hayesomyia senata       140 +         77800       Helopelopia sp       35         81530       Orthocladius (Symposiocladius) lignicola       16         81690       Paratrichocladius sp       +         82141       Thienemanniella xena       +         82220       Tvetenia discoloripes group       +         82820       Cryptochironomus sp       16 +         83040       Dicrotendipes neomodestus       48 +         84450       Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	68708		+			
70600       Antocha sp       3       +         77120       Ablabesmyia mallochi       +         77500       Conchapelopia sp       35         77740       Hayesomyia senata       140       +         77800       Helopelopia sp       35         81530       Orthocladius (Symposiocladius) lignicola       16         81690       Paratrichocladius sp       +         82141       Thienemanniella xena       +         82220       Tvetenia discoloripes group       +         82820       Cryptochironomus sp       16       +         83040       Dicrotendipes neomodestus       48       +         84450       Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)       450       +	68901	Macronychus glabratus	16	•		
70600       Antocha sp       3       +         77120       Ablabesmyia mallochi       +         77500       Conchapelopia sp       35         77740       Hayesomyia senata       140       +         77800       Helopelopia sp       35         81530       Orthocladius (Symposiocladius) lignicola       16         81690       Paratrichocladius sp       +         82141       Thienemanniella xena       +         82220       Tvetenia discoloripes group       +         82820       Cryptochironomus sp       16       +         83040       Dicrotendipes neomodestus       48       +         84450       Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)       450       +	69400	Stenelmis sp	9 +			
77500 Conchapelopia sp 35 77740 Hayesomyia senata 140 + 77800 Helopelopia sp 35 81530 Orthocladius (Symposiocladius) lignicola 16 81690 Paratrichocladius sp + 82141 Thienemanniella xena + 82220 Tvetenia discoloripes group + 82820 Cryptochironomus sp 16 + 83040 Dicrotendipes neomodestus 48 + 84450 Polypedilum (P.) "convictum" (sensu 51mpson and Bode, 1980)	70600	Antocha sp	3 <b>+</b>			
77500 Conchapelopia sp 35 77740 Hayesomyia senata 140 + 77800 Helopelopia sp 35 81530 Orthocladius (Symposiocladius) lignicola 16 81690 Paratrichocladius sp + 82141 Thienemanniella xena + 82220 Tvetenia discoloripes group + 82820 Cryptochironomus sp 16 + 83040 Dicrotendipes neomodestus 48 + 84450 Polypedilum (P.) "convictum" (sensu 51mpson and Bode, 1980)	77120	Ablabesmyia mallochi	+			
77800 Helopelopia sp 35 81530 Orthocladius (Symposiocladius) lignicola 16 81690 Paratrichocladius sp + 82141 Thienemanniella xena + 82220 Tvetenia discoloripes group + 82820 Cryptochironomus sp 16 + 83040 Dicrotendipes neomodestus 48 + 84450 Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	77500		35			
81530 Orthocladius (Symposiocladius) lignicola 81690 Paratrichocladius sp + 82141 Thienemanniella xena + 82220 Tvetenia discoloripes group + 82820 Cryptochironomus sp 16 + 83040 Dicrotendipes neomodestus 48 + 84450 Polypedilum (P.) "convictum" (sensu 450 + Simpson and Bode, 1980)	77740	Hayesomyia senata	140 +			
81690 Paratrichocladius sp + 82141 Thienemanniella xena + 82220 Tvetenia discoloripes group + 82820 Cryptochironomus sp 16 + 83040 Dicrotendipes neomodestus 48 + 84450 Polypedilum (P.) "convictum" (sensu 450 + Simpson and Bode, 1980)	77800	Helopelopia sp	35			
82141 Thienemanniella xena + 82220 Tvetenia discoloripes group + 82820 Cryptochironomus sp 16 + 83040 Dicrotendipes neomodestus 48 + 84450 Polypedilum (P.) "convictum" (sensu Simpson and Bode, 1980)	81530	Orthocladius (Symposiocladius) lignicola	16			
82220 Tvetenia discoloripes group + 82820 Cryptochironomus sp 16 + 83040 Dicrotendipes neomodestus 48 + 84450 Polypedilum (P.) "convictum" (sensu 450 + Simpson and Bode, 1980)	81690		+			
82820 Cryptochironomus sp 16 + 83040 Dicrotendipes neomodestus 48 + 84450 Polypedilum (P.) "convictum" (sensu 450 + Simpson and Bode, 1980)	82141	Thienemanniella xena	+			
83040 Dicrotendipes neomodestus 48 + 84450 Polypedilum (P.) "convictum" (sensu 450 + Simpson and Bode, 1980)	82220	Tvetenia discoloripes group	+			
84450 Polypedilum (P.) "convictum" (sensu 450 + Simpson and Bode, 1980)	82820	Cryptochironomus sp	16 +			
Simpson and Bode, 1980)	83040	Dicrotendipes neomodestus	48 +			
	84450		450 +			
	84750		+			

Collection Date: 08/24/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 9.00

Taxa			Taxa	· · · · · · · · · · · · · · · · · · ·
Code	Taxa	Quant/Qual	Code Taxa	Quant/Qual
01801	Turbellaria	1 +	85500 Paratanytarsus sp	17
03360	Plumatella sp	1	85625 Rheotanytarsus exiguus group	660
05800	Caecidotea sp	+	85752 Sublettea coffmani	69
06700	Crangonyx sp	+	85821 Tanytarsus glabrescens group sp 7	208
08230	Orconectes (Crokerinus) obscurus	+	86100 Chrysops sp	+
08601	Hydracarina	31	86401 Atherix lantha	+
11130	Baetis intercalaris	41 +	87540 Hemerodromia sp	+
12200	Isonychia sp	14 +	96900 Ferrissia sp	39 +
13561	Stenonema pulchellum	18	4	
16700	Tricorythodes sp	9	No. Quantitative Taxa: 29	Total Taxa: 49
17200	Caenis sp	12 +	<u> </u>	
18600	Ephemera sp	+	No. Qualitative Taxa: 37	ICI: <b>40</b>
21200	Calopteryx sp	+	Number of Organisms: 2395	Qual EPT: 8
22001	Coenagrionidae	+		
23909	Boyeria vinosa	+		
45100	Palmacorixa sp	4		
47600	Sialis sp	+		
52200	Cheumatopsyche sp	274 +		
52430	Ceratopsyche morosa group	253 +		•
52530	Hydropsyche depravata group	11 +		
52540	Hydropsyche dicantha	34 <b>+</b>		
59500	Oecetis sp	1	•	
68601	Ancyronyx variegata	2		
68708	Dubiraphia vittata group	1 +		•
68901	Macronychus glabratus	12 +		
69400	Stenelmis sp	2 +		
70600	Antocha sp	1 +		•
	Ablabesmyia mallochi	+		
77355	Clinotanypus pinguis	+		
77750	Hayesomyia senata or Thienemannimyia	52 +		
	norena			
78401	Natarsia species A (sensu Roback, 1978)	+		
78450	Nilotanypus fimbriatus	25		
81270	Nanocladius (N.) spiniplenus	17 +		
81825	Rheocricotopus (Psilocricotopus) robacki	156 +		
82730	Chironomus (C.) decorus group	+		
82820	Cryptochironomus sp	+		•
83040	Dicrotendipes neomodestus	139		
84450	•	295 +		
84470	Polypedilum (P.) illinoense	+		
84540	Polypedilum (Tripodura) scalaenum group	+		
84750	Stictochironomus sp	+		

Collection Date: 08/24/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 8.40

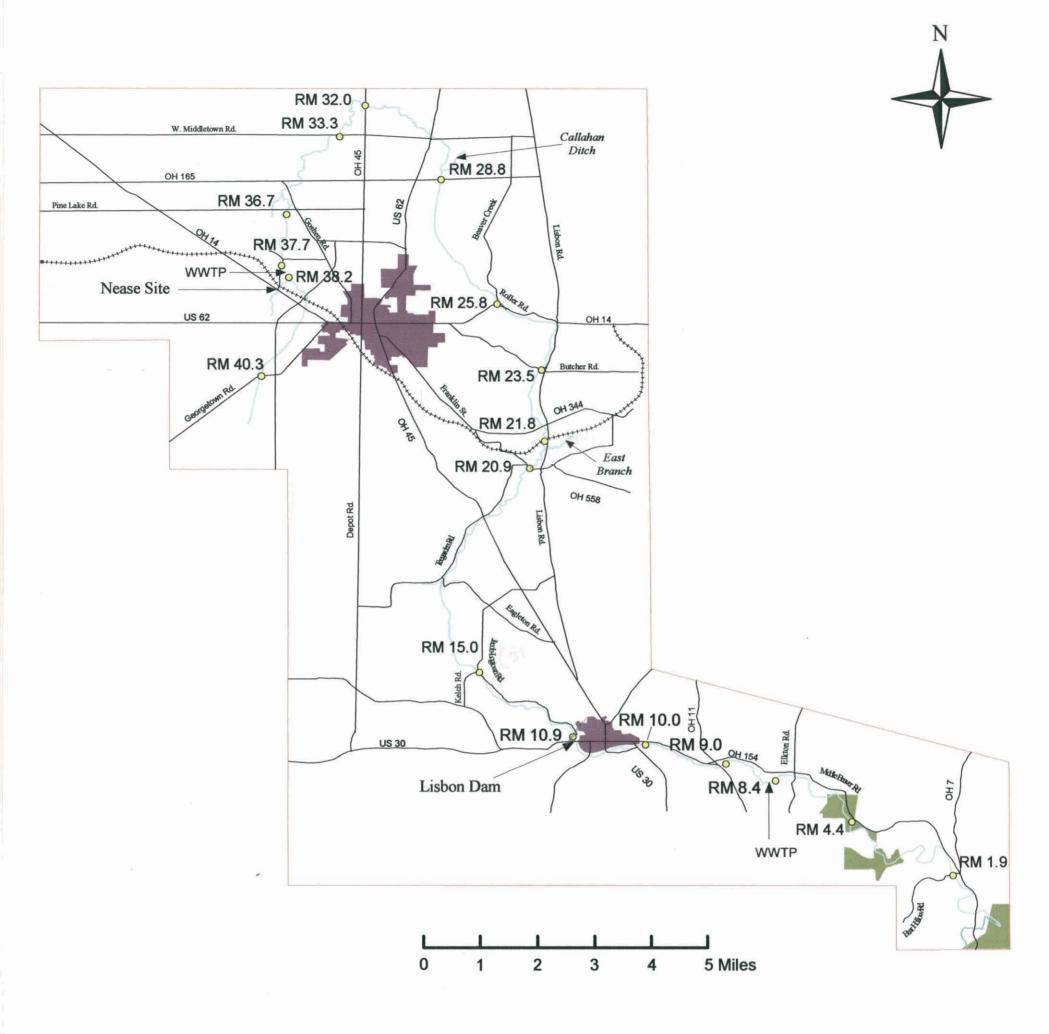
Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa		ا د ا	·
_			Code			uant/	Qua
01801	Turbellaria	18 +	77750	Hayesomyia senata or Thienemann	imyia	61	+
3451	Urnatella gracilis	+	00070	norena			
3600	Oligochaeta	4 +	80370	Corynoneura lobata		4	
)5800 )6700	Caecidotea sp	+	81825	Rheocricotopus (Psilocricotopus) r	obacki	61	
	Crangonyx sp	+	82141	Thienemanniella xena		4	
	Orconectes (Crokerinus) obscurus	+	82730 83040	Chironomus (C.) decorus group			+
	Hydracarina	20		Dicrotendipes neomodestus		183	
	Baetis intercalaris	22 +	84315	Phaenopsectra flavipes		20	
	Centroptilum sp (w/o hindwing pads)	+	84450	Polypedilum (P.) "convictum" (sens Simpson and Bode, 1980)	и	325	+
	Isonychia sp	9 +	84470	Polypedilum (P.) illinoense		0.0	
	Stenacron sp	12 +	84750	Stictochironomus sp		20	
	Stenonema pulchellum	62 +	85500	Paratanytarsus sp			+
	Stenonema vicarium	10	85625	Rheotanytarsus exiguus group		41	
	Tricorythodes sp	9	85752	Sublettea coffmani		913	+
	Caenis sp	24 +	85800	Tanytarsus sp		20	
	Anthopotamus sp	+	85821	Tanytarsus glabrescens group sp 7			*
	Ephemera sp	. +	85840	Tanytarsus guerlus group sp		406 41	
	Coenagrionidae	+	86100	Chrysops sp			
	Argia sp	2 +	86401	Atherix lantha		1	+
	Boyeria vinosa	+	87540	Hemerodromia sp			+
	Gomphus sp	+	95100	Physella sp		5 3	
	Ophiogomphus sp	+		Ferrissia sp		82	
	Stylogomphus albistylus	+	98600	Sphaerium sp			
	Acroneuria abnormis	1		Spraerium sp		•	+
	Sigara sp	<del>+</del> .	No O	wantitative Torre. 41	TP 1 TP		
	Sialis sp	+		uantitative Taxa: 41	Total Taxa:	64	
	Neureclipsis sp	2	-	ualitative Taxa: 41	ICI:	<b>50</b>	
	Cheumatopsyche sp	460 +	Numb	er of Organisms: 3210	Qual EPT:	12	
	Ceratopsyche morosa group	208 +					
	Hydropsyche depravata group	3 +					
	Hydropsyche dicantha	12 +					
	Oecetis sp	4			•		
	Dineutus sp	+					
	Berosus sp	1					
	Ancyronyx variegata	10					
	Dubiraphia vittata group	<b>+</b>					
	Macronychus glabratus	25 +					
	Optioservus sp	+					
	Stenelmis sp	1 +					
	Antocha sp	+					
	Hexatoma sp Conchapelopia sp	<b>+</b> 20					

Collection Date: 08/26/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 4.40

Taxa Code	Taxa	Quant/Qual	Taxa	Taxa	Quant/Qua
		QualivQuai	Code	Taxa	
01320	Hydra sp	4	80410	Cricotopus (C.) sp	61
01801	Turbellaria	1 +	80420	Cricotopus (C.) bicinctus	+
03040	Fredericella sp	1	80430	Cricotopus (C.) tremulus group	31 +
03360	Plumatella sp	+	81632	Parakiefferiella n.sp 2	30
03600	Oligochaeta	54 +	82101	Thienemanniella n.sp 1	32 +
05800	Caecidotea sp	+	82141	Thienemanniella xena	6
08230	Orconectes (Crokerinus) obscurus	+	82220	Tvetenia discoloripes group	+
11130	Baetis intercalaris	1 +	83040	Dicrotendipes neomodestus	132 +
12200	Isonychia sp	1 +	83820	Microtendipes "caelum" (sensu Simpson &	. +
13400	Stenacron sp	275 +		Bode, 1980)	
13561	Stenonema pulchellum	114 +	84450	Polypedilum (P.) "convictum" (sensu	132 +
13570	Stenonema terminatum	11	04400	Simpson and Bode, 1980)	
13590	Stenonema vicarium	11	84480	Polypedilum (P.) laetum group	+
16700	Tricorythodes sp	48 +	84540	Polypedilum (Tripodura) scalaenum group	10
17200	Caenis sp	96	85261	Cladotanytarsus vanderwulpi group Type I	+
18100	Anthopotamus sp	+	85625	Rheotanytarsus exiguus group	92
18600	Ephemera sp	4 +	85752	Sublettea coffmani	61
21200	Calopteryx sp	+	85821	Tanytarsus glabrescens group sp 7	418
22300	Argia sp	+	85840	Tanytarsus guerlus group	41
24900	Gomphus sp	+	87540	Hemerodromia sp	4
42700	Belostoma sp	+	89716	Limnophora discreta	+
45100	Palmacorixa sp	+	94400	Fossaria sp	+
45300	Sigara sp	. +	95100	Physella sp	+
45400	Trichocorixa sp	+	96900	Ferrissia sp	81
47600	Sialis sp	+,	NI. C	)	T 0.4
51300	Neureclipsis sp	+			Taxa: 64
52200	Cheumatopsyche sp	36 <b>+</b>	No. Ç	Qualitative Taxa: 45	ICI: <b>40</b>
52430	Ceratopsyche morosa group	95 +	Numb	per of Organisms: 1993 Qual	EPT: 11
52530	Hydropsyche depravata group	+		-	
53800	Hydroptila sp	8			
59001	Leptoceridae	4			
67500	Laccobius sp	+			
68025	Ectopria sp	+			
68708	Dubiraphia vittata group	2 +			
68901	Macronychus glabratus	25			
69200	Optioservus sp	+			
69400	Stenelmis sp	+			
74501	Ceratopogonidae	+			
77120	Ablabesmyia mallochi	+			
77750	Hayesomyia senata or Thienemannimyia norena	51 +			
77800	Helopelopia sp	10			
78750	Rheopelopia paramaculipennis	10 +			

Collection Date: 08/26/1999 River Code: 08-200 River: Middle Fork Little Beaver Creek RM: 1.90

Taxa	·		Taxa		
Code	Taxa	Quant/Qual	Code	· Taxa	Quant/Qua
01418	Craspedacusta sowerbyi	16	80420	Cricotopus (C.) bicinctus	39 +
03451	Urnatella gracilis	8.	80430	Cricotopus (C.) tremulus group	+
03600	Oligochaeta	283	81240	Nanocladius (N.) distinctus	+
05800	Caecidotea sp	+	81465	Orthocladius (O.) carlatus	39
06201	Hyalella azteca	+	82101	Thienemanniella n.sp 1	116
06830	Gammarus minus	+	82141	Thienemanniella xena	+
08230	Orconectes (Crokerinus) obscurus	+	82220	Tvetenia discoloripes group	+
11130	Baetis intercalaris	+ -	83040	Dicrotendipes neomodestus	426
12200	Isonychia sp	+	84300	Phaenopsectra obediens group	39
13400	Stenacron sp	83 +	84450	Polypedilum (P.) "convictum" (sens	su 310 +
13561	Stenonema pulchellum	796 <b>+</b>		Simpson and Bode, 1980)	
16700	Tricorythodes sp	236	84460	Polypedilum (P.) fallax group	+
17200	Caenis sp	155 +	84470	Polypedilum (P.) illinoense	+
18100	Anthopotamus sp	1	85261	Cladotanytarsus vanderwulpi grou	p Type I 116 +
18600	Ephemera sp	1 +	85625	Rheotanytarsus exiguus group	310 +
21200	Calopteryx sp	+	85752	Sublettea coffmani	77 <b>+</b>
22001	Coenagrionidae	+	85821	Tanytarsus glabrescens group sp 7	2169 +
22300	Argia sp	1 +	85840	Tanytarsus guerlus group	232
23804	Basiaeschna janata	+	94400	Fossaria sp	+
23909	Boyeria vinosa	+	95100	Physella sp	16 +
28955	Libellula lydia	+	96900	Ferrissia sp	56 <b>+</b>
45100	Palmacorixa sp	. +	98600	Sphaerium sp	+
45400	Trichocorixa sp	+		· · · · · · · · · · · · · · · · · · ·	
47600	Sialis sp	l +	No. Ç	uantitative Taxa: 33	Total Taxa: 63
48620	Nigronia serricornis	+	-	Qualitative Taxa: 50	ICI: <b>42</b>
51300	Neureclipsis sp	2	`	·	
52200	Cheumatopsyche sp	47 +	Numb	er of Organisms: 5994	Qual EPT: 9
52430	Ceratopsyche morosa group	62 +			
52530	Hydropsyche depravata group	2			
53800	Hydroptila sp	34 +			
60300	Dineutus sp	+			
63300	Hydroporus sp	+			
67500	Laccobius sp	+			
	Ancyronyx variegata				
68708	Dubiraphia vittata group	28 +			
68901	Macronychus glabratus	22 +		•	
69400	Stenelmis sp	+			•
70600	Antocha sp	+			
72700	Anopheles sp	+			
77120	Ablabesmyia mallochi	77			
77750	Hayesomyia senata or Thienemannimyia	194 +			
	norena	,			
77800	Helopelopia sp	+			
	· · ·				



#### **LEGEND**

Sampling Site

River Mile RM 10.0

Roads

Rivers

West Fork Little Beaver Creek

Railroads

Municipal Areas



Beaver Creek State Forest

Waste Water Treatment Plant

#### REFERENCE

Base map provided by Davey Resource Group, Kent, Ohio

## Figure 1

## Middle Fork Little Beaver Creek 1999 Sampling Sites

File No. G6154-03 GIS By: MRM Dated: 03/31/00



FIGURE 2
MIDDLE FORK LITTLE BEAVER CREEK
INVERTEBRATE COMMUNITY INDEX (ICI)

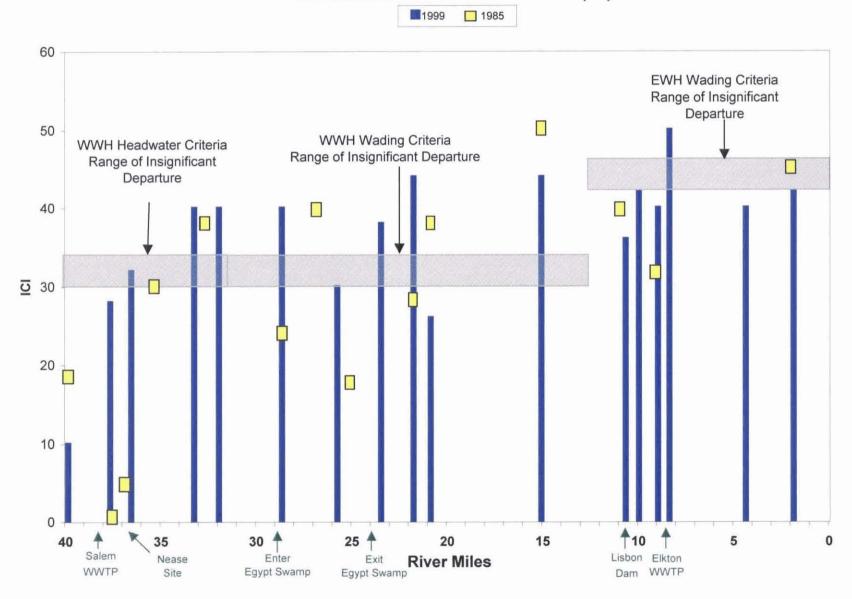


FIGURE 3
MIDDLE FORK LITTLE BEAVER CREEK
MODIFIED INDEX OF WELL-BEING (MI<sub>wb</sub>)

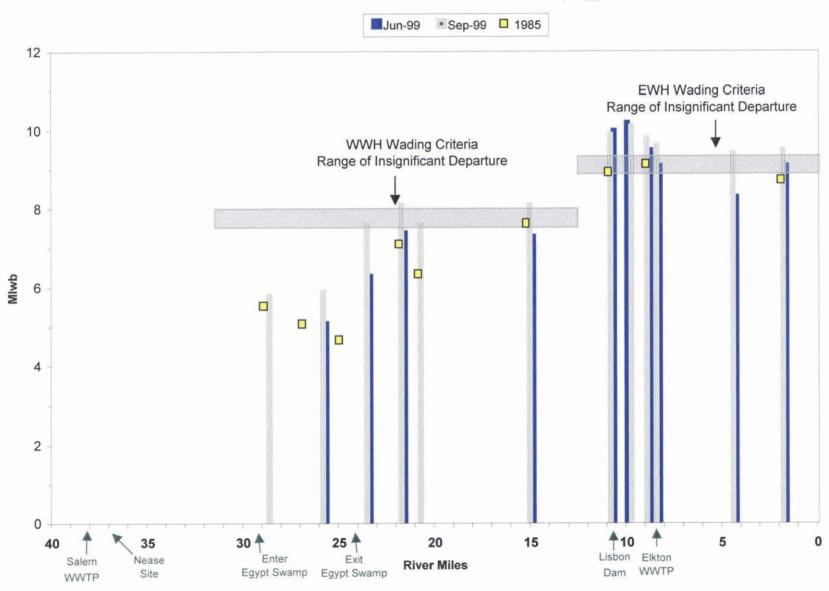
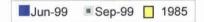


FIGURE 4
MIDDLE FORK LITTLE BEAVER CREEK
INDEX OF BIOTIC INTEGRITY (IBI)



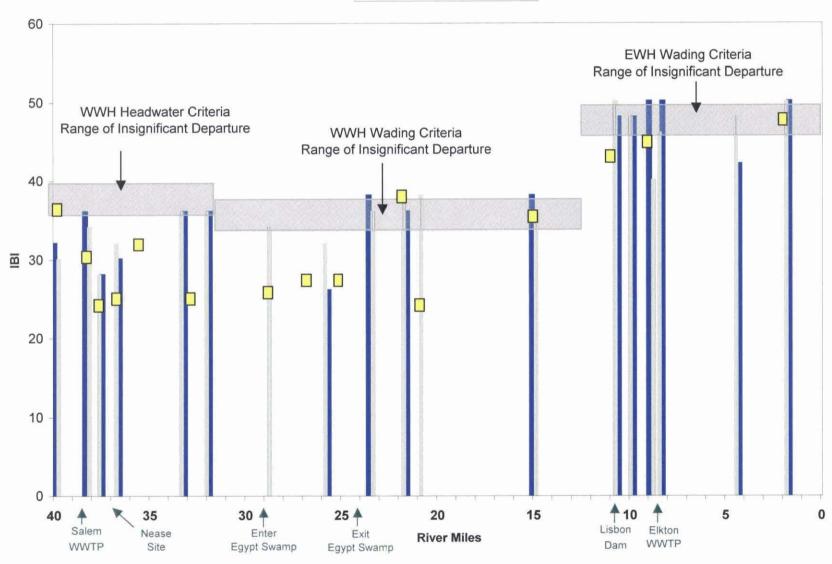


FIGURE 5
MIDDLE FORK LITTLE BEAVER CREEK
QUALITATIVE HABITAT EVALUATION INDEX (QHEI)

■1999 **□**1985

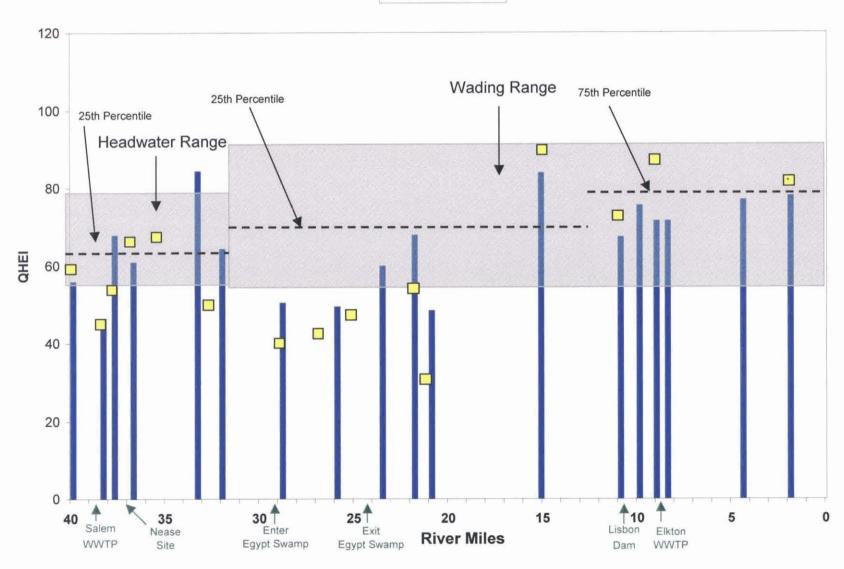


FIGURE 6
MIDDLE FORK LITTLE BEAVER CREEK
EDIBLE FISH MIREX LEVELS: 1999 DATA



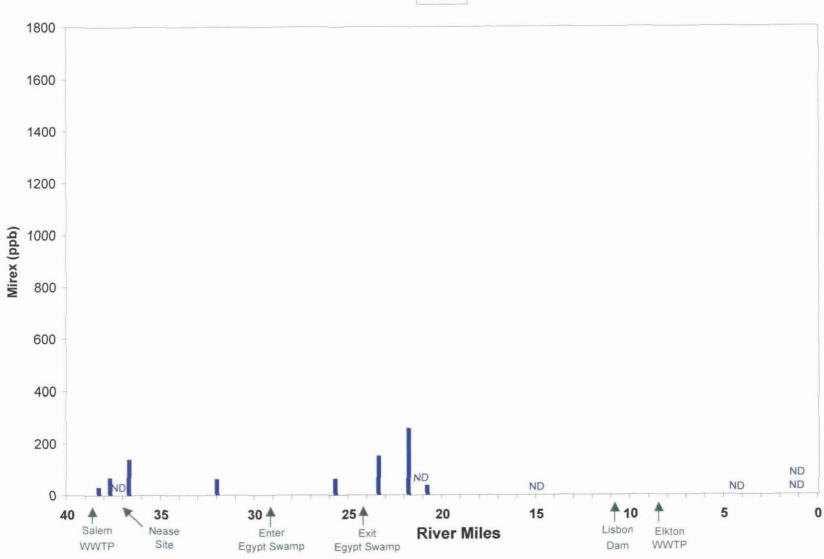
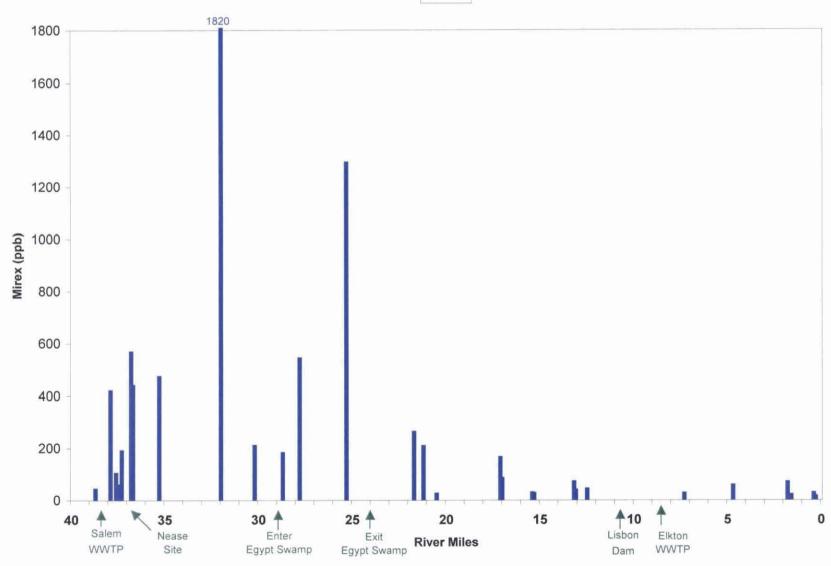


FIGURE 7
MIDDLE FORK LITTLE BEAVER CREEK
EDIBLE FISH MIREX LEVELS: RI DATA





Page 1 of 1

FIGURE 8
MIDDLE FORK LITTLE BEAVER CREEK
SEDIMENT MIREX LEVELS: 1999 DATA



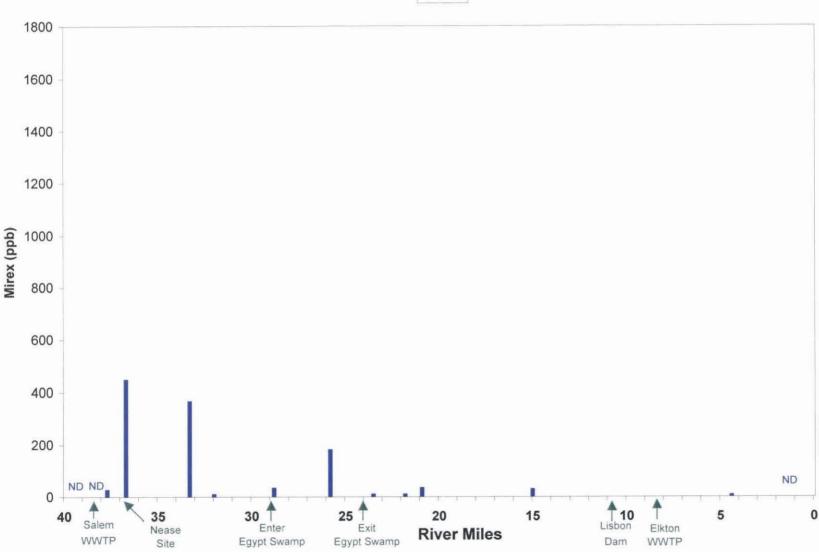
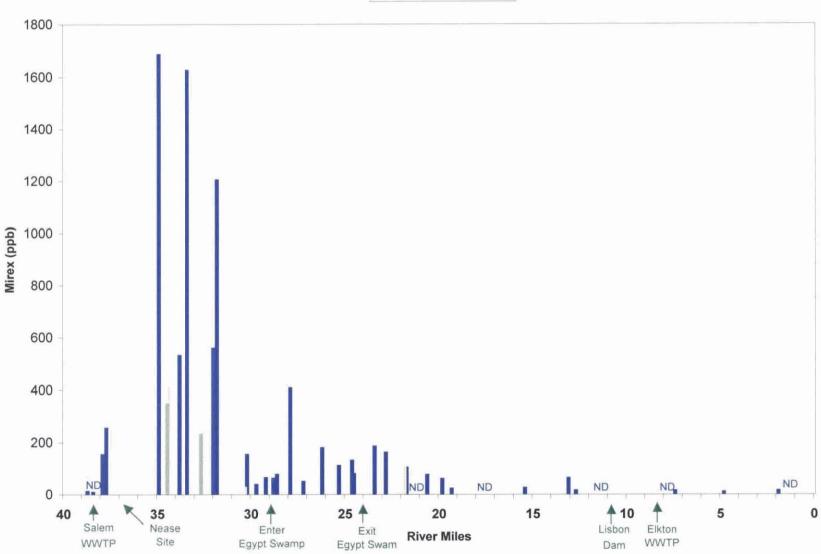


FIGURE 9
MIDDLE FORK LITTLE BEAVER CREEK
SEDIMENT MIREX LEVELS: RI DATA

■1991 <sup>38</sup> 1993 <sup>18</sup> 1995



#### APPENDIX A

MFLBC Focused Ecological Assessment Sampling Plan

## MFLBC FOCUSED ECOLOGICAL ASSESSMENT SAMPLING PLAN

#### Introduction

This document describes the work elements to be undertaken by RUTGERS Organics Corporation (ROC) as part of the MFLBC Focused Ecological Assessment. The remaining components of the work, specifically aquatic community sampling to evaluate Ohio Biocriteria Indices, will be undertaken by the Ohio Environmental Protection Agency (OEPA) Division of Surface Water. Fieldwork will be conducted jointly by ROC's consultants and OEPA, commencing July 12, 1999, to ensure the representativeness and comparability of the data collected by the two groups.

#### **Sampling Locations**

The following sampling locations have been selected by OEPA and USEPA:

River Mile	Description
40.3	"Background"
38.3	Immediately downstream of Salem Wastewater Treatment Plant (WWTP),
	downstream historical discharges on Buttermilk Creek
37.8	Immediately downstream of Salem WWTP, upstream of Nease
36.7	Upper low flow area of MFLBC, immediately downstream of Nease
33.3	Upper low flow area of MFLBC (Middletown Road/upstream crossing)
31.3	Higher flowing area before Egypt Swamp
28.8	Open straight reach through Egypt Swamp
27.1	Lower area of Egypt Swamp
25.1	Faster moving segment in ravine
20.9	Open wider flood plain near Franklin Square
15.1	Forested ravine
9.0	Downstream of (old) WWTP
4.6	Intermediate location between River Miles 9 and 1.9
1.9	Sediment deposition area

Joint field reconnaissance will be conducted by ROC and the OEPA to select the exact sampling locations to ensure that the data is representative and that appropriate descriptions of the sampling locations, habitats and potential anthropogenic influences are recorded.

#### Fish Tissue Sampling and Analysis

Fish tissue will be collected from each of the above sampling locations for analysis of mirex, photomirex, and kepone. Sampling will follow Ohio EPA's Fish Tissue Consumption Monitoring Program (FTCMP) protocol<sup>1</sup>.

#### Sediment Chemistry Sampling and Analysis

Sediment samples will be collected from each of the above sampling locations using the Agency-approved methodology used in all prior MFLBC sediment sampling by ROC (ERM-Midwest, March 1990). The protocol specifies collecting samples from the stream bottom to a depth of 6 to 8 inches using a clean stainless steel trier (cylindrical tube for soil recovery). Samples will be homogenized in a clean stainless steel bowl and placed in a laboratory-supplied amber glass jar. Samples will be analyzed for the following constituents:

- TCL VOCs
- TCL SemiVOCs
- TCL Pesticides
- TAL Metals
- Mirex, Photomirex, and Kepone
- Grain Size Analysis
- Total Organic Carbon

#### Surface Water Sampling and Analysis

Surface water samples will be collected from each of the above sampling locations using the Agency-approved methodology used in all prior MFLBC sampling by ROC (ERM-Midwest, March 1990). Parameters measured in the field will include:

- Temperature
- Dissolved Oxygen
- pH
- Total dissolved solids

Surface water samples will also be collected for laboratory analysis of the following parameters:

- Biological Oxygen Demand (BOD)
- Total suspended solids
- Nutrients (nitrogen series and phosphorus)

<sup>&</sup>lt;sup>1</sup> Ohio Environmental Protection Agency (1994) Fish Tissue Monitoring Program Guidance Manual: MAS/1994-11-1

#### Quality Assurance

All sampling will be conducted under strict Quality Assurance procedures in accordance with the Agency-approved methodology used in all prior MFLBC sampling by ROC (ERM-Midwest, March 1990). Procedures will include:

- Field decontamination of all sampling equipment between each sampling location;
- Collection of field duplicate samples at the rate of one duplicate per twenty primary samples;
- Analysis of field blank samples at the rate of one per twenty samples;
- Analysis of laboratory blank samples;
- Analysis of matrix spike/matrix spike duplicate samples at the rate of one per twenty samples;
- Frequent calibration of all instruments used to collect field parameter measurements;
- Independent data validation of 100 percent of samples.

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#### APPENDIX B

Field Survey Report Middle Fork Little Beaver Creek

### Field Survey Report

## Middle Fork of Little Beaver Creek Mahoning and Columbiana Counties, Ohio

#### **Prepared for**

Rütgers Organics Corporation 201 Struble Road State College, Pennsylvania 16801 814-238-2424

Prepared by

Davey Resource Group 1500 North Mantua Street P.O. Box 5193 Kent, Ohio 44240 800-445-8733

October, 1999

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#### INTRODUCTION

Davey Resource Group conducted field surveys along the Middle Fork of Little Beaver Creek (MFLBC) between July 12, 1999 and July 21, 1999. This report summarizes the scope of work, sample locations, field activities and results. Fieldwork was conducted by Dawn Nighman, Susan McCauslin, and Michael Johnson whose professional resumes are included with this report (Appendix A).

#### SCOPE OF WORK

The scope of work for this project followed guidelines and protocols prepared by Golder Associates, Inc., and approved by the United States Environmental Protection Agency (USEPA) Region V and the Ohio Environmental Protection Agency (EPA) (Appendix B). This scope included fish tissue, sediment and surface water sampling at each of fourteen sample locations.

In addition to the scope identified in the Workplan (Appendix B), Davey Resource Group biologists coordinated with Ohio EPA to collect additional data to address the recreational value of the fisheries at each sample site. Additional data included the lengths and individual weights of each species considered to have recreational or commercial value as identified by Davey Resource Group (1997).

At each site, Davey Resource Group field scientists coordinated sampling efforts with the Ohio EPA and United States EPA to reach consensus regarding the location where sediment samples were taken and the species of fish that were sacrificed for tissue analysis. Samples were collected in conformance with the protocol set forth in the Workplan (Appendix B).

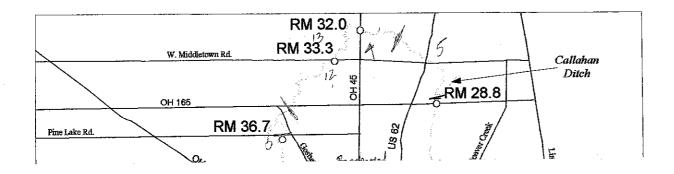
#### SAMPLING LOCATIONS

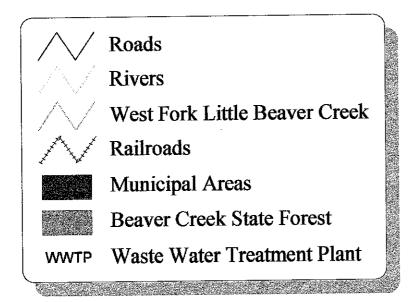
Table 1 lists all sites that were sampled for the parameters identified in the Workplan prepared by Golder Associates (Appendix B). Figure 1 shows the locations of sample sites. The locations of some of the sample sites differ slightly from the original Workplan because it was necessary to adjust some sampling sites due to limited equipment access as well as differing sampling objectives. The original intent of most sites generally remained the same.

Table 1: Location of Sample Sites - MFLBC

Rivermile	Description	Geographic Reference	1
40.3	Background	Georgetown Road	1
38.3	Upstream of Salem WWTP	Salem Industrial Park	l
37.7	Downstream of Salem WWTP	Allen Road	ŀ
36.7	Upper low flow area	Pine Lake Road	l
33.3	Upper low flow area	Middletown Road	ŀ
32.0	Higher flow area	Ohio 45	ŀ
28.8	Upper reach of Egypt Swamp	Ohio 165	İ
25.8	Lower reach of Egypt Swamp	Beaver Creek Road	Ì
23.5	Faster flowing segment	Butcher Road	ŀ
21.8	Upstream of East Branch tributary	Lisbon-Canfield Road	İ
20.9	Downstream of East Branch tributary	Ohio 558	1
15.0	Forested ravine area	Kelch Road	ŀ
4.4	Intermediate location	Lusk Lock Road	١
1.9	Sediment deposition area	Bear Hollow Road	

# Figure 1. Middle Fork Little Beaver Sample Sites







#### SITE DESCRIPTIONS

#### RM 40.3 @ Georgetown Road (Photograph 1, Appendix F)

This is the uppermost headwater site selected for sampling. Surrounding land use is residential with lawn and landscape planting extending to the edge of the stream. The site is dominated by pool habitats and the benthic substrates are composed of fine sediments and organic matter.

#### RM 38.3 @ Salem Industrial Park (Photograph 2, Appendix F)

This site is located just upstream of the Salem Wastewater Treatment Plant (WWTP) discharge pipe. Surrounding land use is wooded and industrial, and the riparian zone has been recently disturbed. The site supports riffles, runs, and pools within the creek. Benthic substrates are composed of fine sediments and organic matter.

#### RM 37.7 @ Allen Road (Photograph 3, Appendix F)

This site is located just downstream of the Salem WWTP. The surrounding landscape is primarily wooded and most of the riparian area is buffered by tree canopy. Riffles, runs, and pools are all present and cobbles and gravel compose the majority of the benthic substrates. Fine sediments and organic matter are restricted to the slower moving pool areas.

#### RM 36.7 @ Pine Lake Road (Photograph 4, Appendix F)

This site supports well-developed riffles, runs, and deep pools. Gravel and a few cobbles compose the benthic substrates of the swifter flowing areas while fine sediments have settled in the slower pools. Overall, the presence of silt was noted to be unusually high for this area and may impact fish communities. The surrounding landscape is primarily natural and the stream is buffered by vegetation and tree canopy.

#### RM 33.3 @ Middletown Road (Photograph 5, Appendix F)

This site supports a well-developed riffle, run, and pool complex. Gravel dominates the swifter flowing areas and fine sediments are restricted to slower flowing areas. The surrounding landscape is primarily natural and the stream is buffered by vegetation and tree canopy.

#### RM 32.0 @ Ohio 45 (Photograph 6, Appendix F)

This site supports a poorly developed riffle, run, and pool complex. The majority of the stream is very shallow and overhanging vegetation provides the best refuge for fish species. The surrounding landscape is primarily natural and the stream is buffered by tree canopy. The majority of the streambed is composed of fine sediments with a few areas of gravel and cobble.

#### RM 28.8 @ Ohio 165 (Photograph 7, Appendix F)

This site represents the upper reach of Egypt Swamp and is dominated by pool habitats. The area appears to have been historically channelized and the surrounding land use is natural and residential. Benthic substrates are primarily fine sediments and organic matter.

#### RM 25.8 @ Beaver Creek Road (Photograph 8, Appendix F)

This site represents the lower reach of Egypt Swamp and is characterized by slow flowing water, fine sediments, and ample macrophyte growth. The area appears to have been historically channelized and dredged which may account for the limited instream habitat. Channelization decreases the diversity of habitats available to fish and aquatic wildlife.

#### RM 23.5 @ Butcher Road (Photograph 9, Appendix F)

As the Middle fork exits Egypt Swamp, velocities increase and sediment deposition decreases. This site still maintains deep pools with fine sediments but several well-developed riffles and runs begin to form in this area.

#### RM 21.8 @ Lisbon-Canfield Road (Photograph 10, Appendix F)

This site is located just upstream of the East Branch tributary to the Middle Fork and is characterized by long, deep pools with fine-grained sediments. A few well-developed riffles and runs can be found here which provide habitat for a greater variety of fish species.

#### RM 20.9 @ Ohio 558 (Photograph 11, Appendix F)

This site is located downstream of the East Branch tributary in the vicinity of Franklin Square. It is highly channelized with deep deposits of fine sediments and organic material. There is little protective effect from surrounding vegetation and most of the stream is exposed to full sunlight.

#### RM 15.0 @ Kelch Road (Photograph 12, Appendix F)

This site flows through a forested ravine and supports well-developed riffles, runs, and pools. Sediments are composed of gravel and cobbles in the swifter flowing areas and fine sediments in the slower flowing areas.

#### RM 4.4 @ Lusk Lock Road (Photograph 13, Appendix F)

This site is located within the confines of the State Forest and supports the best instream habitat noted during this survey. There are well-developed riffles and runs composed of boulders, cobbles, and gravel. Several deep pools are present with benthic substrates of fine sediments and organic matter. Riparian vegetation is natural and most of the site supports successional or mature tree canopy. Despite the diversity of habitats and benthic substrates, siltation was noted to be greater than normally expected.

#### RM 1.9 @ Bear Hollow Road (Photograph 14, Appendix F)

This is the furthest sampling site located downstream on the Middle Fork, within this study. Most of the area is dominated by pool habitats although a single riffle area was observed at the downstream end of this sample site. Benthic substrates are composed of cobbles and gravel with some depositional areas of fine sediments. The surrounding land use is residential and natural.

#### **DEVIATIONS FROM WORKPLAN**

Several deviations were made from the original Workplan, with respect to field activities, and they include the following:

Site Selection - Several of the sites selected for sampling deviated slightly from the original Workplan as previously described. Most deviations were minor and the original intent of site selection remained unchanged with two exceptions: RM 9.0 located downstream of the abandoned wastewater treatment plant (WWTP) in the Lisbon area was initially identified for sampling by Golder Associates; however, Ohio EPA did not sample this site as part of this study. Ohio EPA plans to sample this site as part of another, unrelated study. In addition, RM 21.8 was added to determine the effect of the East Branch tributary on the biota of the Middle Fork; this site was not identified in the original Workplan. This tributary carries wastewater effluent from the communities of Washingtonville and Leetonia and this site was intended to identify the potential impact of this tributary on the water quality of the Middle Fork.

**Sample Storage** - Some of the samples were shipped to the laboratory with sealed bags of ice cubes, as opposed to solely using "blue ice" as is called for in the Workplan. This substitution was made because the temperature of samples transported in the first shipment of coolers to the laboratory were too low.

#### **Fish Tissue Collection**

Davey Resource Group followed Ohio EPA guidelines as identified in the Workplan (Appendix B). Ohio EPA protocols indicate that at each site, an effort should be made to sample the same species of fish for comparison of results between sites. However, sampling should also be biased to collect the dominant game species at each site as these fish are more likely to be consumed by anglers. The later criterion is considered more important than the consistency of selecting the same species between sites (Dave Altvater, personal communication). At each site, Davey Resource Group and Ohio EPA biologists selected individual specimens for tissue sampling. In a few instances (RM's 20.9, 23.5, 25.8, and 37.7) consensus was not achieved concerning which species and individuals would most likely be considered preferable by anglers. In these situations, two samples were collected to accommodate the best professional judgment of both Ohio EPA and Davey Resource Group biologists.

#### RESULTS OF FIELD SURVEYS

Tables 2-5 summarize information regarding all of the samples collected. Table 6 summarizes water quality measurements taken during the collection of surface water samples.

Table 2. Fish Tissue Sample Log - MFLBC

Collection	River-		Type of fish	Time	Ship Date	Skin on	Skin off	# of Fish
Date	mile	Sample #			7/21	X	UII	1 1311
7/15	1.9	FT19A	Smallmouth bass	4:00 pm				1
7/15	1.9	FT19B	Channel cat	4:00 pm	7/20		X	1
7/15	4.4	FT50	Smallmouth bass	3:00 pm	7/20	X		2
7/15	15.0	FT150	White sucker	11:00 am	7/20	X		2
7/14	20.9	FT209A	Largemouth	8:00 pm	7/15	Х		1
			bass					
7/14	20.9	FT209B	Bluegill	8:00 pm	7/15	X		6
7/14	21.8	FT218	Rock bass	6:00 pm	7/15	X		2
7/14	23.5	FT235A	Carp	3:00 pm	7/14		Χ	2
7/14	23.5	FT235B	Bluegill	3:00 pm	7/14	X		4
7/14	25.8	FT258A	Carp	11:30 am	7/14		X	2
7/14	25.8	FT258B	White sucker	11:30 am	7/14	X		2
7/13	28.8	FT288	Carp	7:30 pm	7/14		X	2
7/13	32.0	FT320	White sucker	6:00 pm	7/14	X		4
7/13	33.3	FT333	Carp	12:30 pm	7/13		X_	2
7/13	36.7	FT367	White sucker	10:00 am	7/13	X		2
7/12	37.7	FT378A	Yellow bullhead	9:00 pm	7/13		X	2
7/12	37.7	FT378B	White sucker	9:00 pm	7/13	X		3
7/12	38.3	FT383	Yellow bullhead	4:00 pm	7/12		X	2

Note RM 40.3 did not yield any fish of suitable size for tissue sampling.

Table 3. Surface Water Sample Log - MFLBC

Collection Date	Rivermile	Sample #	Time	Ship Date
7/20	1.9	SW19	9:20 am	7/20
7/20	4.4	SW45	11:00 am	7/20
7/20	4.4	SW54 (duplicate)	11:00 am	7/20
7/20	15.0	SW150	3:00 pm	7/20
7/20	20.9	SW209	5:00 pm	7/20
7/20	21.8	SW218	5:30 pm	7/20
7/21	23.5	SW235	9:40 am	7/21
7/21	25.8	SW258	10:20 am	7/21
7/21	28.8	SW288	10:50 am	7/21
7/21	32.0	SW320	11:50 am	7/21
7/21	33.3	SW333	12:00 pm	7/21
7/21	36.7	SW367	2:00 pm	7/21
7/21	37.7	SW378	2:40 pm	7/21
7/21	38.3	SW383	3:10 pm	7/21
7/21	38.3	SW838 (duplicate)	3:10 pm	7/21
7/21	40.3	SW403	3:45 pm	7/21

Table 4. Sediment Sample Log - MFLBC

Collection	Rivermile	Sample #	Time	Ship Date
Date				
7/20	1.9	SD19	9:20 am	7/20
7/20	4.4	SD45	11:00 am	7/20
7/20	4.4	SD54 (duplicate)	11:00 am	7/20
7/15	15.0	SD150	9:00 am	7/15
7/15	15.0	SD105 (duplicate)	9:00 am	7/15
7/14	20.9	SD209	7:00 pm	7/15
7/14	21.8	SD218	4:00 pm	7/14
7/14	23.5	SD235	2:00 pm	7/14
7/14	25.8	SD258	9:00 am	7/14
7/14	25.8	SD852 (duplicate)	9:00 am	7/14
7/13	28.8	SD288	7:00 pm	7/14
7/13	32.0	SD320	3:30 pm	7/13
7/13	33.3	SD333	12:30 pm	7/13
7/13	36.7	SD367	9:00 am	7/13
7/13	36.7	SD763 (duplicate)	9:00 am	7/13
7/12	37.7	SD378	4:30 pm	7/12
7/12	38.3	SD383	2:30 pm	7/12
7/12	38.3	SD838 (duplicate)	2:30 pm	7/12
7/12	40.3	SD403	11:45 am	7/12

Table 5, Field Blank Sample Log - MFLBC

Table 5. Field Dialif	Table 3. Field Diank Sample Log - Mir Lbo										
Collection Date	Rivermile	Sample #	Time	Ship Date							
7/20	4.4	FB720	2:00 pm	7/20							
7/15	15.0	FB715	10:00 am	7/15							
7/14	25.8	FB714	11:30 am	7/14							
7/21	28.8	FB721	11:00 am	7/21							
7/13	36.7	FB713	9:30 am	7/13							
7/12	38.3	FB712	3:00 pm	7/12							

Table 6. Water Quality Measurements - MFLBC

Collection Date	Rivermile	Temperature (°C)	Dissolved Oxygen (mg/L)	pH (s.u.)	Total Dissolved Solids (mg/L)	Conductivity (μs)	Flow Velocity (ft/s)
7/20	1.9	26.7	9.3	6.87	508	1038	0.62
7/20	4.4	26.6	9.9	7.91	534	1999	1.0
7/20	15.0	27.3	17.8	8.49	542	1072	0.30
7/20	20.9	30.1	13.7	7.18	736	1457	0.20
7/20	21.8	30.0	18.4	8.42	942	1847	0.30
7/20	23.5	24.3	8.8	7.82	1180	2360	0.30
7/20	25.8	23.8	8.2	7.85	1250	2440	0.56
7/20	28.8	25.2	8.0	7.95	1500	2960	0.30
7/20	32.0	24.6	7.8	8.14	713	1362	0.56
7/20	33.3	24.5	9.4	8.12	803	1578	0.67
7/20	36.7	26.8	8.6	7.95	1230	2420	0.48
7/20	37.7	27.0	10.7	7.69	1300	2550	0.83
7/20	38.3	29.2	15.9	8.35	387	776	0.30
7/20	40.3	28.2	13.6	8.33	282	552	N/A

#### **EVALUATION OF RECREATIONAL FISHERIES**

Davey Resource Group biologists worked with Ohio EPA to collect additional data to address the recreational value of the fisheries at each sample site. Additional data included the lengths and individual weights of each species considered to have recreational or commercial value as identified in Davey Resource Group (1997). Interpretation of data is based in the numbers of fish and size of individuals. Raw data is presented in Appendix C. A summary of results based on length data is presented in Table 7. In addition, species were divided into three categories of recreational value and described in Davey Resource Group (1997) and outlined below.

Class A species are game fish that are considered carnivores and piscivores. These top trophic predators usually attain the largest sizes, provide dramatic escape responses to anglers, and provide the most available flesh per individual fish. Species of the Middle Fork included in this category are smallmouth bass, largemouth bass, rock bass, warmouth sunfish, grass pickerel and grass pickerel x chain pickerel hybrids. Although rainbow and brown trout were found during the Remedial Investigation conducted by Ruetgers-Nease consultants (Ruetgers-Nease Corporation, 1996), these fish were rare and only found at one station downstream of the Lisbon Dam. These fish are not native to the eastern United States and their presence in the Middle Fork is most likely an accidental migration from portions of the Beaver Creek drainage in Pennsylvania that are stocked and managed as trout fisheries (Pennsylvania Fish & Boat Commission, 1997).

Class B species are game fish that are smaller in size and typically non-carnivorous in nature. Although smaller, these middle trophic species can be more abundant than Class A species. With the possible exception of channel catfish, these fish tend to offer less resistance to anglers resulting in less dramatic captures and generally provide less flesh per individual fish. Species of the Middle Fork included in this category are channel catfish, black crappie, bluegill sunfish, pumpkinseed sunfish, bowfin, and yellow perch.

Class C species are those fish that are only marginally considered recreational game species. Although these fish can be quite large, provide dramatic angling, and provide large amounts of flesh per individual fish, they are typically avoided by most anglers. These species are rarely managed in most recreational fisheries and are often considered undesirable as they can compete with Class A and B game fish for food and other resources. Fish species of the Middle Fork included in this category are bullhead catfish (yellow, brown, and black), white sucker, freshwater drum, and common carp.

Table 7. Summary of Recreational Fisheries Data - MFLBC.

C		

Smallmouth Bass Largemouth Bass Grass Pickeral Rock Bass Sauger

#### CLASS B

Bluegill Sunfish
Green Sunfish
Pumpkinseed Sunfish
Black Crappie
Channel Catfish

#### CLASSIC

White Sucker
Hog Sucker
Silver Redhorse Sucker
Black Redhorse Sucker
Golden Redhorse Sucker
Freshwater Drum
Common Carp
Yellow Bullhead
Brown Bullhead

RM 38.8	RM 37.8	RM 36.7	RM 33,3	RM 32.0	RM 28.8	RM 25.8	RM 23.5	RM 21.8	RM 20.9	RM 15.0	RM 4.5	RM 1.9
SML	SML	SML	SML	SML	SML	SML	SML	SML	SML	SML	SML	SML
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									1			
	3 19	3 9 2 4 19 53 49 28	S M L S M L	S M L         S M L           1         1           3         9           2         2           3         3           4         3           3         4           3         4           4         3           4         3           4         4           53         49           28         48           48         65           13         15           16         6	S M L       S M L       S M L       S M L         1       1       1         3       9       4       2         4       2       3       1         19       53 49 28       48 65 13       15 16 6       21 5 5         5       5	S M L   S M	S M L   S M	S M L   S M	S M L   S M	S M L	S M L   S M	S   M   L   S

S = Small < 6" M = Medium 6"-8" L = Large > 8"

### **Narrative Description of Results**

The overall results of this survey generally agree with the *Study of Recreational Use* conducted by Davey Resource Group (1997). The upper areas of the Middle Fork (RM 40.3 - RM 25.8) were evaluated as unsuitable for recreational fisheries based upon a habitat survey and evaluation of existing secondary source data. Few Class A or Class B species are found at these sites and the few that do occur are in the small or medium size range. Although these areas may not support the trophy species associated with most desirable recreational fisheries, some sites do support extensive populations of Class C species; many of which are larger individuals. The most common Class C species is white sucker, which is commonly harvested in rural areas during spring mating runs.

RM 23.5 is located in a stretch of stream that was previously identified as being of marginal value in terms of recreational fishing. Although this site is still dominated by Class C species, a single large Class A species was captured during this survey.

RM 21.8 and RM 20.9 are located in a stretch of stream that was previously evaluated as unsuitable in terms of its use as a recreational fishery. However, the current data suggest a better fishery than previously anticipated. Both of these sites yielded several Class A species including a healthy population of rock bass.

RM 15.0 was previously identified as being ideal for use as a recreational fishery but the current data suggest a lower value that anticipated. No Class B and only a few, smaller Class A species were noted during this survey. However, this site still supports a healthy community of Class C species of all size classes.

RM 4.5 and RM 1.9 fall within a stretch of stream that was identified in the 1997 Davey study to be ideal for use as a recreational fishery and the data collected during this survey support that classification. Although Class C species still dominate the overall recreational community, there are several Class A and Class B species of all size ranges. RM 4.5 is particularly significant as it is the first site that smallmouth bass are present. Smallmouth bass are widely considered the most important recreational species in the entire Little Beaver drainage.

#### POTENTIAL SOURCES OF IMPARMENT

Throughout the course of this investigation, several sources were noted that might impact the health and quality of the aquatic communities. These can be divided into categories as described below.

### Municipal and Industrial

There are several sources of pollution that can adversely affect the quality of water, fish and macroinvertebrate communities, and recreational potential of the Middle Fork of Little Beaver Creek. The municipalities of Salem and Elkton each have a wastewater treatment facility that discharges directly into the Middle Fork. The plant in Elkton is new and located directly upstream from the Elkton Road bridge. The City of Lisbon recently tied into this new facility, closing down their older treatment plant. The municipalities of Washington and Leetonia both maintain wastewater treatment facilities that discharge into Valley Run. Valley Run eventually becomes the East Branch and discharges into the Middle Fork near RM 22. One of the greatest impacts often associated with these facilities is a lowering of dissolved oxygen downstream of the effluent discharge. The data presented in Table 6 indicate that this is indeed the case concerning the Salem WWTP. Dissolved oxygen concentrations fall sharply just downstream of the discharge and continue for some length downstream.

In addition to municipal discharges, there are nine coal mining/production operations that discharge directly into the Middle Fork, a plastics operation, a steel fabricating

operation, and several miscellaneous dischargers that use the Middle Fork as a receiving body. A list of these dischargers is presented in Appendix D.

#### **Erosion and Sedimentation**

Sedimentation is considered a serious pollution problem in many streams. Silt and fine sediments settle on the stream bottom and suffocate the eggs and larvae of fish and other aquatic organisms. During the course of this investigation, there were many sites where silt and fine sediments were noted to be more than normally expected and potentially problematic. High sediment loads were prominent at RM 4.4 and RM 1.9. Likely contributors to sedimentation at these sites include the sand and gravel mining operation in the City of Lisbon (Photograph 15, Appendix F), local development and land clearing (Photograph 16, Appendix F), as well as the intensive agriculture within the watershed (Photograph 17, Appendix F).

### **Channelization and Dredging**

Channelization decreases the diversity of habitats available to fish and aquatic wildlife. Channelization typically replaces naturally occurring habitat features such as riffles, runs, and pools with a homogenous environment dominated by pool or glide habitat. Channelized streams typically are exposed to direct sunlight, and combined with the absence of riffles, are often lower in oxygen concentrations. Channelization and dredging restrict the meandering nature of streams and lock them into narrow courses. Channelization and dredging also prevent streams from having ready access to associated floodplains which can have negative impacts on fish and riparian wildlife that rely on these associated habitats for all or part of their life cycle. RM 28.8 through RM 20.9 has been severely modified in this manner.

### **Fish Migration Barriers**

Physical barriers are often serious impediments to fish communities in small streams and creeks. Headwater sites are usually too small to allow most fish to overwinter. Most of the larger game species spend the winter months in larger streams and tributaries. In spring and early summer, some of these fish may venture into the more headwater sites for spawning and seasonal residence in the deeper pools (Schlosser, 1982). Physical barriers that can exclude migratory species from upstream sites can include artificial structures such as culverts and dams as well as natural waterfalls and beaver impoundments. Any structure that restricts the free movement of fish is likely to reduce or eliminate certain top level predators from areas upstream of the barrier. This has especially been noted for smallmouth bass which seasonally migrate into headwater sites for spring reproduction (Trautman, 1981). There are numerous culverts that might restrict fish movements along the Middle Fork. However, the dam in the City of Lisbon is probably the most serious and notable barrier (Photograph 18, Appendix F). Smallmouth bass is a highly migratory species with important recreational value. Despite the presence of suitable habitat, this species has never been documented above the Lisbon Dam.

## **APPENDIX A**

**Profiles of Field Investigators** 

## **Project Team Profile**

Michael D. Johnson, M.A. Vertebrate Zoologist/Natural Resources Davey Resource Group

Michael Johnson joined Davey in 1997. He specializes in fish, mammal, amphibian, and reptile studies. He is responsible for conducting ecological surveys, park inventories, and wetlands delineations. He is project manager for ecological surveys required for NEPA compliance and writes environmental documents. Mr. Johnson coordinates all endangered species studies at Davey and has extensive experience conducting habitat surveys and mist-netting studies for rare bats. Mr. Johnson has 10 years of experience in the environmental sciences. Prior to joining Davey, he served as a wildlife biologist for an environmental consulting firm; a zoologist for the Ohio Department of Natural Resources, assistant curator of vertebrate zoology with the Cleveland Museum of Natural History. He also has taught at the secondary and university levels.

#### Education

- M.A.T., Biology (Secondary Education, General Science), 1993 Kent State University, Kent, Ohio
- B.A., Biological Sciences (Vertebrate Zoology), 1991 Kent State University, Kent, Ohio

### Certifications/Special Training

- Ohio Environmental Protection Agency: Certified stream ecologist for fish (IBI, MIwb) and habitat (QHEI) surveys and data analysis
- Bat Conservation International: Bat conservation and management training workshop
- United States Fish & Wildlife Service: Currently holds federal permit to conduct Indiana bat (Myotis sodalis) mist-netting studies

## **Professional Organizations**

- Bat Conservation International Research Associate
- Northern Ohio Association of Herpetologists
- Ohio Academy of Science
- Ohio Biological Survey
- American Fisheries Society

## **Project Team Profile**

Dawn M. Nighman, M.S. Environmental Hydrogeologist Davey Resource Group

Ms. Nighman is a project manager for hydrogeological services provided by Davey Resource Group, and she manages projects including environmental site assessments, stormwater management and erosion control, water and soil sampling, and other hydrogeological projects. She has over six years of experience in the assessment and management of groundwater, surface water, and stormwater; conducting environmental site assessments; compliance with stormwater, hazardous waste, and community right-to-know regulations; and erosion and sediment control. Her experience has been obtained through environmental consulting, government grants, and academic research.

Ms. Nighman has modeled groundwater and surface water resources; developed stormwater pollution prevention plans; conducted Phase I and Phase II Environmental Site Assessments, and Phase III remediation activities; performed environmental compliance audits; prepared SARA reports; completed environmental permit applications; and sampled groundwater, stormwater and soils. In addition, Ms. Nighman has done extensive research on the design and performance characteristics of stormwater and sedimentation basins.

#### Education

- . M.S., Geology, 1994, Kent State University, Kent, Ohio
- . B.S., Physics, 1992, John Carroll University, Cleveland, Ohio

## Certifications/Training

- Certified Professional in Erosion and Sediment Control (CPESC #1363)
- OSHA Hazardous Waste Site Operations 40-hour Training
- Stream Restoration using Bioengineering Techniques
- Stream Assessment and Field Measurement Techniques

### **Publications**

- Infiltration Practices for Flood Control
- Trap Efficiency of a Stormwater Basin With and Without Baffles
- Sediment Basins: Using sediment basins, sediment traps and modified stormwater management basins to reduce pollution from construction sites in Ohio
- Pollutant Trap Efficiency of a Stormwater Retention Basin

## Professional Affiliations/Community Involvement

- International Erosion Control Association
- Cuyahoga Valley Association
- Ohio Academy of Science
- · Soil and Water Conservation Society
- · Cleveland Engineering Society
- Northeast Ohio Chapter of Hazardous Materials Managers
- Earth Team Volunteer, Natural Resources Conservation Service

## APPENDIX B

Work Plan

#### Golder Associates Inc.

305 Fellowship Road, Suite 200 Mt. Laurei, NJ USA 08054 Tel: (609) 273-1110 Fax (609) 273-0778



Project No.: 933-6154

June 23, 1999

Mr. Anthony Rutter
USEPA Region 5
Waste Management Division
Office 4, Superfund
77 West Jackson Boulevard
Chicago, IL 60604

Mr. Joseph E. Trocchio
Ohio Environmental Protection Agency
Div. of Emergency and Remedial Response
Northeast District Office
2110 East Aurora Road
Twinsburg, OH 44087

RE: MFLBC SAMPLING PLAN, NEASE SITE, SALEM, OHIO

#### Gentlemen:

Golder Associates Inc. (Golder Associates), on behalf of RÜTGERS Organics Corporation (ROC), has prepared a sampling plan to be used for the upcoming sample collection proposed for the Middle Fork of Little Beaver Creek (MFLBC). Two copies of the plan have been attached for your review and approval.

ROC requests expeditious approval of the plan in order to meet the sampling schedule planned for the week of July 12, 1999. If you should have any questions regarding this plan, please do not hesitate to contact Golder Associates at 856-273-1110 or Mr. Ralph Pearce of ROC at 814-238-9287.

Very truly yours,

GOLDER ASSOCIATES INC.

Lori Anne Hendel Senior Project Manager

LAH/bjb

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cc: Mike Johnson, Davey Resource Group (1 copy)

Rainer Domalski/Ralph Pearce, ROC (1 copy)

# MFLBC FOCUSED ECOLOGICAL ASSESSMENT SAMPLING PLAN

#### Introduction

This document describes the work elements to be undertaken by RUTGERS Organics Corporation (ROC) as part of the MFLBC Focused Ecological Assessment. The remaining components of the work, specifically aquatic community sampling to evaluate Ohio Biocriteria Indices, will be undertaken by the Ohio Environmental Protection Agency (OEPA) Division of Surface Water. Fieldwork will be conducted jointly by ROC's consultants and OEPA, commencing July 12, 1999, to ensure the representativeness and comparability of the data collected by the two groups.

Sampling Locations

The following sampling locations have been selected by OEPA and USEPA:

River Mile	Description
40.3	"Background"
38.3	Immediately downstream of Salem Wastewater Treatment Plant (WWTP), downstream historical discharges on Buttermilk Creek
37.8	Immediately downstream of Salem WWTP, upstream of Nease
36.7	Upper low flow area of MFLBC, immediately downstream of Nease
33.3	Upper low flow area of MFLBC (Middletown Road/upstream crossing)
31.3	Higher flowing area before Egypt Swamp
28.8	Open straight reach through Egypt Swamp
27.1	Lower area of Egypt Swamp
25.1	Faster moving segment in ravine
20.9	Open wider flood plain near Franklin Square
15.1	Forested ravine
9.0	Downstream of (old) WWTP
4.6	Intermediate location between River Miles 9 and 1.9
1.9	Sediment deposition area

Joint field reconnaissance will be conducted by ROC and the OEPA to select the exact sampling locations to ensure that the data is representative and that appropriate descriptions of the sampling locations, habitats and potential anthropogenic influences are recorded.

Fish Tissue Sampling and Analysis

Fish tissue will be collected from each of the above sampling locations for analysis of mirex, photomirex, and kepone. Sampling will follow Ohio EPA's Fish Tissue Consumption Monitoring Program (FTCMP) protocol<sup>1</sup>.

Sediment Chemistry Sampling and Analysis

Sediment samples will be collected from each of the above sampling locations using the Agency-approved methodology used in all prior MFLBC sediment sampling by ROC (ERM-Midwest, March 1990). The protocol specifies collecting samples from the stream bottom to a depth of 6 to 8 inches using a clean stainless steel trier (cylindrical tube for soil recovery). Samples will be homogenized in a clean stainless steel bowl and placed in a laboratory-supplied amber glass jar. Samples will be analyzed for the following constituents:

- TCL VOCs
- TCL SemiVOCs
- TCL Pesticides
- TAL Metals
- Mirex, Photomirex, and Kepone
- Grain Size Analysis
- Total Organic Carbon

Surface Water Sampling and Analysis

Surface water samples will be collected from each of the above sampling locations using the Agency-approved methodology used in all prior MFLBC sampling by ROC (ERM-Midwest, March 1990). Parameters measured in the field will include:

- Temperature
- Dissolved Oxygen
- pH
- · Total dissolved solids

Surface water samples will also be collected for laboratory analysis of the following parameters:

- Biological Oxygen Demand (BOD)
- Total suspended solids
- Nutrients (nitrogen series and phosphorus)

<sup>&</sup>lt;sup>1</sup> Ohio Environmental Protection Agency (1994) Fish Tissue Monitoring Program Guidance Manual: MAS/1994-11-1

Quality Assurance

All sampling will be conducted under strict Quality Assurance procedures in accordance with the Agency-approved methodology used in all prior MFLBC sampling by ROC (ERM-Midwest, March 1990). Procedures will include:

- Field decontamination of all sampling equipment between each sampling location;
- Collection of field duplicate samples at the rate of one duplicate per twenty primary samples;
- Analysis of field blank samples at the rate of one per twenty samples;
- Analysis of laboratory blank samples;
- Analysis of matrix spike/matrix spike duplicate samples at the rate of one per twenty samples;
- Frequent calibration of all instruments used to collect field parameter measurements;
- Independent data validation of 100 percent of samples.

G:\PROJECTS\933-6154\MFLBCWK.DOC

## APPENDIX C

Recreational Fisheries - Raw Data

## APPENDIX C: RECREATIONAL FISHERIES RAW DATA - MFLBC

Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Pumpkinseed Sunfish		Total #: 1	
Class B		Avg. Length: 7.3"	
		Avg. Weight: .3 oz.	
White Sucker	Total #: 19	Total #: 2	
Class C	Avg. Length: 4.4"	Avg. Length: 7.4"	
	Avg. Weight:	Avg. Weight: 2.9 oz.	

Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Bluegill	Total #: 3		
Class B	Avg. Length: 1.8"		
	Avg. Weight: .18 oz.		
White Sucker	Total #: 19		
Class C	Avg. Length: 1.9"		
	Avg. Weight: .07 oz.		
Yellow Bullhead	Total #: 3	Total #: 1	
Class C	Avg. Length: 43"	Avg. Length: 6.7"	
	Avg. Weight: .9 oz.	Avg. Weight: 2.8 oz.	

RM 37.8 @ Allen Road 7-12-99				
Species	Small, < 6"	Medium, 6"-8"	Large, > 8"	
Largemouth Bass	Total #: 1			
Class A	Avg. Length: 3.7"			
	Avg. Weight: .6 oz.			
Bluegill	Total #: 9			
Class B	Avg. Length: 2.7"			
	Avg. Weight: .13 oz.			
Pumpkinseed	Total #: 4			
Class B	Avg. Length: 3.4"			
	Avg. Weight: .56 oz.			
Green Sunfish	Total #: 2			
Class B	Avg. Length: 3.8"			
	Avg. Weight: .88 oz.			
Yellow Bullhead	Total #: 2	Total #: 1		
Class C	Avg. Length: 4.9"	Avg. Length: 7.7"		
	Avg. Weight: 1.34 oz.	Avg. Weight: 4.2 oz.	_	
White Sucker	Total #: 53	Total #: 49	Total #: 28	
Class C	Avg. Length: 1.8"	Avg. Length: 5.7"	Avg. Length: 8.1"	
	Avg. Weight: .07 oz.	Avg. Weight: 1.3 oz.	Avg. Weight: 4.0 oz.	

RM 28.8 @ Ohio 165	7-13-99		
Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Largemouth Bass	Total #: 1		
Class A	Avg. Length: 5.9"		
	Avg. Weight: 2.4 oz.		
Grass Pickeral	Total #: 2	Total #: 1	
Class A	Avg. Length: 3.4"	Avg. Length: 6.7"	
	Avg. Weight: .14 oz.	Avg. Weight: 1.2 oz.	
Bluegill	Total #: 1		
Class B	Avg. Length: 4.9"		
	Avg. Weight: 1.8 oz.		
Pumpkinseed	Total #: 2		
Class B	Avg. Length: 3.7"		
	Avg. Weight: .67 oz.		
Green Sunfish	Total #: 8		
Class B	Avg. Length: <6"		
	Avg. Weight: 1.2 oz.		
Yellow Bullhead			Total #: 1
Class C			Avg. Length: 9.1"
			Avg. Weight: 3.0 oz.
White Sucker	Total #: 3	Total #: 1	Total #: 7
Class C	Avg. Length: < 6"	Avg. Length: 6.6"	Avg. Length: 9.4"
	Avg. Weight: .47 oz.	Avg. Weight: 1.8 oz.	Avg. Weight: 4.5 oz.
Common Carp			Total #: 3
Class C			Avg. Length: 20.9"
			Avg. Weight: 69.4 oz.
			4.3 lbs.

Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Largemouth Bass	Total #: 3		
Class A	Avg. Length: < 6"		
	Avg. Weight: .40 oz.		
Gross Pickeral	Total #: 4		
Class A	Avg. Length: < 6"		
	Avg. Weight: .35 oz.		
Bluegill	Total #: 3		
Class B	Avg. Length: < 6"		
	Avg. Weight: .81 oz.		
Pumpkinseed	Total #: 1		
Class B	Avg. Length: 5.5"		
	Avg. Weight: 2.3 oz.		
Green Sunfish	Total #: 3		
Class B	Avg. Length: < 6"		
	Avg. Weight: 1.8 oz.		

Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Yellow Bullhead		Total #: 1	Total #: 1
Class C		Avg. Length: 6.6"	Avg. Length: 9"
		Avg. Weight: 12.5 oz.	Avg. Weight: 6.0 oz.
White Sucker	Total #: 7	Total #: 4	Total #: 25
Class C	Avg. Length: < 6"	Avg. Length: 6-8"	Avg. Length: 11.5'
	Avg. Width: .08 oz.	Avg. Weight: 1.4 oz.	Avg. Weight: 6.2 oz.
Hog Sucker	Total #: 1	Total #: 1	Total #: 1
Class C	Avg. Length: 4.1"	Avg. Length: 7.2"	Avg. Length: 11.9"
	Avg. Weight: 12.5 oz.	Avg. Weight: 10.1 oz.	Avg. Weight: 12.6 oz.
Common Carp			Total #: 4
Class C			Avg. Length: 24.5"
			Avg. Weight: 137.3 oz.
			8.6 lbs.

RM 23.5 @ Butcher	Road 7-14-99		
Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Largemouth Bass Class A	Total #: 1 Avg. Length: 2.6" Avg. Weight: .11 oz.		
Grass Pickeral Class A			Total #: 1 Avg. Length: 8.1" Avg. Weight: 2.1 oz.
Black Crappie Class B	Total #: 1 Avg. Length: 5.7" Avg. Weight: 1.9 oz.		
Bluegill Class B	Total #: 8 Avg. Length: 4.4" Avg. Weight: 1.4 oz.		
Pumpkinseed Class B	Total #: 3 Avg. Length: 3.1" Avg. Weight: .35 oz.		
Yellow Bullhead Class C			Total #: 1 Avg. Length: 9.8" Avg. Weight: 9.5 oz.
White Sucker Class C	Total #: 1 Avg. Length: < 6" Avg. Weight: .7 oz.		Total #: 2 Avg. Length: 10.1" Avg. Weight: 6.4 oz.
Hog Sucker Class C	Total #: 2 Avg. Length: 4.9" Avg. Weight: .67 oz.	Total #: 1 Avg. Length: 7" Avg. Weight: 2.8 oz.	Total #: 9 Avg. Length: 10.3" Avg. Weight: 7.8 oz.
Common Carp Class C			Total #: 6 Avg. Length: 21.4" Avg. Weight: 94.6 oz. 5.9 lbs.

Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Rock Bass	Total #: 4	Total #: 4	Total #: 2
Class A	Avg. Length: 4.9"	Avg. Length: 6.9"	Avg. Length: 8.9"
	Avg. Weight: .1.7 oz.	Avg. Weight: 4.4 oz.	Avg. Weight: 8.7 oz.
Grass Pickeral	Total #: 1		
Class A	Avg. Length:		
	Avg. Weight:		
Yellow Bullhead		Total #: 3	
Class C		Avg. Length: 6.6"	
		Avg. Weight: 2.8 oz.	
White Sucker	Total #: 2	Total #: 3	Total #: 13
Class C	Avg. Length: < 6"	Avg. Length: 7.2"	Avg. Length: 10.2"
	Avg. Weight: .04 oz.	Avg. Weight: 2.5 oz.	Avg. Weight: 6.6 oz.
Hog Sucker	Total #: 4	Total #: 1	Total #: 7
Class C	Avg. Length: <6"	Avg. Length: 6.6"	Avg. Length: 9.4"
	Avg. Weight: .84 oz.	Avg. Weight: 1.9 oz.	Avg. Weight: 6.2 oz.

RM 20.9 @ Franklin	Square 7-14-99		
Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Largemouth Bass Class A	Total #: 1 Avg. Length: 4.3" Avg. Weight: .67 oz.		Total #: 1 Avg. Length: 8.1" Avg. Weight: 5.3 oz.
Rock Bass Class A	Total #: 2 Avg. Length: 3.9" Avg. Weight: .88 oz.		
Black Crappie Class B			Total #: 1 Avg. Length: 8.9" Avg. Weight: 6.7 oz.
Bluegill Class B	Total #: 8 Avg. Length: 4.3" Avg. Weight:	Total #: 1 Avg. Length: 6.7" Avg. Weight: 4.4 oz.	
Brown Bullhead Class C		Total #: 1 Avg. Length: 7.9" Avg. Weight: 4.9 oz.	
Yellow Bullhead Class C	Total #: 1 Avg. Length: 3.7" Avg. Weight: .32 oz.		Total #: 1 Avg. Length: 9.3" Avg. Weight: 3.1 oz.
White Sucker Class C	Total #: 2 Avg. Length: 3.5" Avg. Weight: .38 oz.	Total #: 1 Avg. Length: 7.5" Avg. Weight: 2.8 oz.	Total #: 9 Avg. Length: 10.1" Avg. Weight: 6.4 oz.
Hog Sucker Class C	Total #: 4 Avg. Length: <6" Avg. Weight: 1.3 oz.		Total #: 2 Avg. Length: 9.8" Avg. Weight: 6.5 oz.

RM 15.0 @ Logtown	/Kelch Road Intersection	7-15-99	
Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Rockbass	Total #: 1		
Class A	Avg. Length: 5.2"		
	Avg. Weight: 2.1 oz.	,	
Largemouth Bass	Total #: 1		
Class A	Avg. Length: 1.6"		
	Avg. Weight: .04 oz.		
White Sucker	Total #: 13	Total #: 8	Total #: 7
Class C	Avg. Length: <6"	Avg. Length: 6"-8"	Avg. Length: 9.6"
	Avg. Weight: .16 oz.	Avg. Weight: 1.6 oz.	Avg. Weight: 5.6 oz.
Hog Sucker	Total #: 2	Total #: 7	Total #: 17
Class C	Avg. Length: <6"	Avg. Length: 6.9"	Avg. Length: 9.7"
	Avg. Weight: .53 oz.	Avg. Weight: 2.6 oz.	Avg. Weight: 7.0 oz.

RM 4.5 @ Lusk Loc	k Road 7-15-99		
Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Smallmouth Bass Class A	Total #: 1 Avg. Length: <6" Avg. Weight: .14 oz.	Total #: 3 Avg. Length: 7.0" Avg. Weight: 2.4 oz.	Total #: 5 Avg. Length: 13.6" Avg. Weight: 19.4 oz. 1.2 lbs.
Rock Bass Class A		Total #: 1 Avg. Length: 6.4" Avg. Weight: 3.2 oz.	
Bluegill Class B	Total #: 2 Avg. Length: <6" Avg. Weight: .37 oz.		
Green Sunfish Class B	Total #: 1 Avg. Length: <6" Avg. Weight: .11 oz.		
Drum Class C			Total #: 8 Avg. Length: 14.6" Avg. Weight: 21.2 oz. 1.3 lbs.
White Sucker Class C		Total #: 1 Avg. Length: 7.3" Avg. Weight: 2.4 oz.	Total #: 2 Avg. Length: 14.0" Avg. Weight: 16.1 oz. 1.0 lbs.
Black Redhorse Sucker Class C			Total #: 3 Avg. Length: 14.6" Avg. Weight: 17.2 oz. 1.1 lb.
Golden Redhorse Sucker Class C			Total #: 1 Avg. Length: 13.1" Avg. Weight: 14 oz.

Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Silver Redhorse			Total #: 1
Sucker			Avg. Length: 19.7"
Class C			Avg. Weight: 49.4 oz.
			3.1 lbs.
Hog Sucker	Total #: 1	Total #: 2	Total #: 7
Class C	Avg. Length: <6"	Avg. Length: 5.7"	Avg. Length: 11.0"
	Avg. Weight: .89 oz.	Avg. Weight: 1.2 oz.	Avg. Weight: 8.0 oz.
Common Carp			Total #: 8
Class C			Avg. Length: 18.6"
			Avg. Weight: 50.6 oz.
			3.2 lbs.

Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Smallmouth Bass Class A			Total #: 1 Avg. Length: 11.5" Avg. Weight: 11.7 oz.
Sauger Class A			Total #: 1 Avg. Length: 15" Avg. Weight: 11.8 oz.
Rockbass Class A		Total #: 1 Avg. Length: 5.4" Avg. Weight: 1.8 oz.	
Channel Catfish Class B			Total #: 1 Avg. Length: 17.3" Avg. Weight: 32.1 oz. 2.0 lbs.
Bluegill Class B	Total #: 2 Avg. Length: 3.3" Avg. Weight: .39 oz.	Total #: 1 Avg. Length: 5.9" Avg. Weight: 2.7 oz.	
Green Sunfish Class B	Total #: 2 Avg. Length: 2.6" Avg. Weight: .28 oz.		
Common Carp Class C			Total #: 4 Avg. Length: 21" Avg. Weight: 4.6 lbs.
Freshwater Drum Class C			Total #: 2 Avg. Length: 14" Avg. Weight: 18.6 oz.
Black Redhorse Sucker Class C			Total #: 15 Avg. Length: 14.5" Avg. Weight: 17.3 oz.

Species	Small, < 6"	Medium, 6"-8"	Large, > 8"
Silver Redhorse			Total #: 1
Sucker			Avg. Length: 16.9"
Class C	1		Avg. Weight: 30.3 oz.
Hog Sucker	Total #: 2		Total #: 16
Class C	Avg. Length: 1.9"		Avg. Length: 11.7"
	Avg. Weight: .07 oz.		Avg. Weight: 11.0 oz.
Golden Redhorse			Total #: 3
Sucker			Avg. Length: 13.6"
Class C	\		Avg. Weight: 15.9 oz.
Yellow Bullhead			Total #: 2
Class C			Avg. Length: 9.3"
		1	Avg. Weight: 6.8 oz.
White Sucker	Total #: 1		
Class C	Avg. Length: 2.0"		
	Avg. Weight: .04 oz.		

## APPENDIX D

**List of Pollution Dischargers - MFLBC** 

7. Johnson From SANDY Kenner Lavy 100.
(330) 673-5408 Fax# 644-20

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THLLL11165	IN	CULUMBIANA	0	MAHONING	COUNTIES
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LNO	NPIO		CNTN	ккалывыния опканцавической пределением выстановный правит
	040021276	COLUMBIANA VILLAGE	COLUMBIANA	
DODOOR	040023671	U.S. CORP OF ENGINEERS	MAHONING	MAHONING HIVER
900005	040024091	BELOIT, VILLAGE OF	MAHONING	MAHONING RIVER
800000	0H0024325	CAMPBELL, CITY OF	MAHONING	MAHONING RIVER MAHONING RIVER
2000007	080026206	LOWELLVILLE, VILLAGE OF	MAHONING	
000000	00027600	STRUTHERS, CITY OF	MAHONING	MAHONING RIVER
PE00006	OHD028223	YOUNGSTOWN, CITY OF	MAHONING	MAHONING RIVER
0100040	040043851	MAHONING COUNTY COMMISSIONE	MAHONING	MAHONING RIVER
N00071	0H0084093	GREENSTEEL INC	MAHONING	MAHONING RIVER
P00024	OHO088706	KEFFLER & ROSE ENTERPRISES	COLUMBIANA	MAHONING RIVER
		C & E COAL CO	COLUMBIANA	MC CORMICK RUN
		MAHONING CO. BD. OF COMM.	MAHONING	MEANDER CREEK
05000d	OH0087785	LISBON COAL CRUSHERS INC	COLUMBIANA	MIDDLE FORK LITT
P00057	QHQQ93459	INDUSTRIAL MINING CO	COLUMBIANA	NIDDLE FORK LITT
P00059	DH0093475	INDUSTRIAL MINING CO	COLUMBIANA	MIDDLE FORK LITT
P00111	OHG099937	M & S COAL CO	COLUMBIANA	MIDDLE FORK LITT
P00012	OH0087670	EAST FAIRFIELD COAL CO	COLUMBIANA	MIDDLE FORK OF L
PD0044	0H0090557	EAST FAIRFIELD COAL CO	COLUMBIANA	MIDDLE FORK OF L
N00138	DH0092231	FERRIS COAL CO INC	COLUMBIANA	MIDDLE FORK OF L
00065	OHU093726	CARDINAL MINING INC	COLUMBIANA	MIDDLE FORK OF L
	040122084	ELKTON WHTP	COLUMBIANA	MIDDLE FORK OF L
00129	040100862	CENTER MINING COMPANY	COLUMBIANA	MIDDLE FORK TO B
200002	Q457.500HO	MAHONING COUNTY - BOARDMAN	MAHOMING	MILL CREEK
C00074	OHO064238	YOUNGSTOWN HARDCHROME, INC.	MAHONING	MILL CREEK
600041	OHO088129	MARATHON OIL CO. YOUNGSTOWN	MAHONING	MILL CREEK
V00250	289£80CHO	LISSON BOARD OF PUBLIC AFF.	COLUMBIANA	MILL SITE CREEK
800000	040006891	WARKEN CONSOLIDATED INDUSTR	MAHONING	MUSKINGUM RIVER
L00014	<b>2682800HO</b>	FERRIS COAL CO	COLUMBIANA	N FORK OF LITTLE
		THOMPSON BROS MINING CO	MAHONING	N FORK OF LITTLE
200035	OHOD90239	BLUM COAL CO	COLUMBIANA	NORTH FORK - LIT
800008	OHDO87343	STAR K MINING	COLUMBIANA	NORTH FORK OF YE
920008	OH0063746	SALINEVILLE, VILLAGE OF	COLUMBIANA	NORTH FORK YELLO
100015	OHO077410	THE HALL CHINA COMPANY	COLUMBIANA	OHIO RIVER
E00040	OHO012327	THE STERLING CHINA CO.	COLUMBIANA	OHIO RIVER
		EAST LIVERPOOL, CITY OF	COLUMBIANA	OHIO RIVER
000023	0H0028045	WELLSVILLE, CITY OF	COLUMBIANA	DHIO RIVER
600007	8006200HO	ASHLAND DIL INC	COLUMBIANA	DHIO RIVER
G00037	OH 00 64157	WELLSVILLE STORAGE AND TRAN	COLUMBIANA	OHIO KIVER
NOC297	OH0123617	02 JIO 48	COLUMBIANA	OHIO HIVER
L00013	040083887	CAN MINING COMPANY, INC	COLUMBIANA	PATTERSON CREEK
00123	OHO100480	FERRIS COAL COMPANY, INC.	COLUMBIANA	PATTERSON RUN
00144	OH0106615	C & E COAL INCORPORATED	COLUMBIANA	PATTERSON TO W F
00020	040012165	LAKE PARK TOOL MACHINE	MAHONING	PINE HOLLOW CREE
R00110	040091707	PONDEROSA PARK RESORTS INC	MAHONING	PONDEROSA LAKE
860009	0H0093831	HANOVER COAL INC	COLUMBIANA	SANDY CREEK
900069	0H0093921	BUCKEYE INDUSTRIAL MINE INC	COLUMBIANA	SANDY CREEK
00076	010094048	JOHN GLENN MINING COMPANY	COLUMBIANA	SANDY CREEK
200118	3H0100153	COALBROOK MINING, INC.	COLUMBIANA	SANDY CREEK
CB1001	010122076	THE STATE MATERIAL PROCESS	COLUMBIANA	SANDY CREEK

FROM

# APPENDIX E

References

## REFERENCES

- Davey Resource Group, 1997. Study of Recreational Use, Middle Fork of Little Beaver Creek: Columbiana and Mahoning Counties, Ohio.
- Ruetgers-Nease Corporation, 1996. Remedial Investigation Report Nease Site, Salem, Ohio. Volume I. Submitted to U.S. Environmental Protection Agency Region 5 Chicago, Illinois.
- Schlosser, I.J. 1982. Fish Community Structure and Function Along Two Habitat Gradients in a Headwater Stream. Ecological Monographs, 52(4) 395-414.
- Trautman, M. B. 1981 (revised edition). *The Fishes of Ohio*. Ohio State University Press, Columbus. xxv + 782 pp.
- Vannote, R. L., W. Minshall, K. W. Cummins, J. R. Sedell, and C. E. Cushing. 1980. The river continuum concept. *Can. J. Fish Aquat. Sci.* 37:130-137.
- Winemiller, K.O. and D.H. Taylor. 1982. Smallmouth Bass Nesting Behavior and Nest Site Selection in a Small Ohio Stream. *Ohio J. Sci.* 82(5) 266.

## APPENDIX F

Photographs

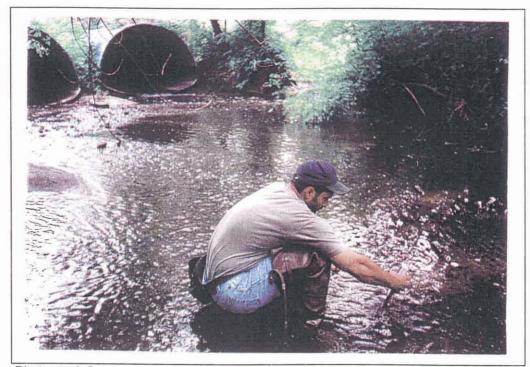
## APPENDIX F: PHOTOGRAPHS OF SITE



Photograph 1 RM 40.3 @ Georgetown Road



Photograph 2 RM 38.3 @ Salem Industrial Park



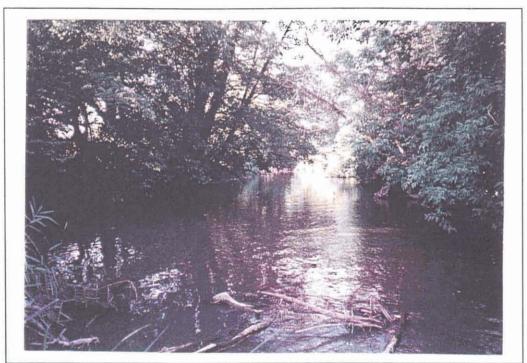
Photograph 3 RM 37.7 @ Allen Road



Photograph 4 RM 36.7 @ Pine Lake Road



Photograph 5 RM 33.3 @ Middletown Road



Photograph 6 RM 32.0 @ Ohio 45



Photograph 7 RM 28.8 @ Ohio 165



Photograph 8 RM 25.8 @ Beaver Creek Road



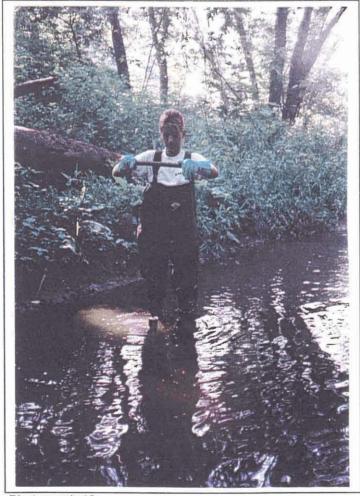
Photograph 9 RM 23.5 @ Butcher Road



Photograph 10 RM 21.8 @ Lisbon-Canfield Road



Photograph 11 RM 20.9 @ Ohio 558



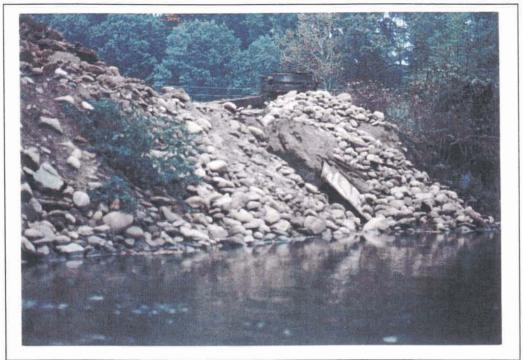
Photograph 12 RM 15.0 Kelch Road



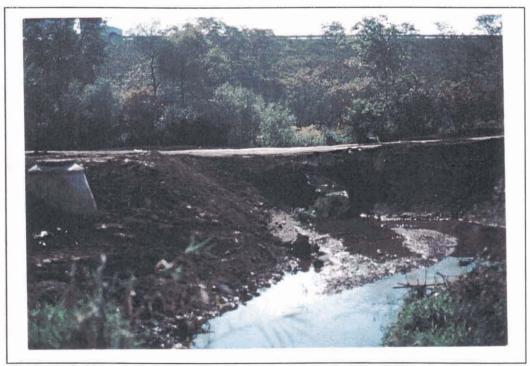
Photograph 13 RM 4.4 @ Lusk Lock Road



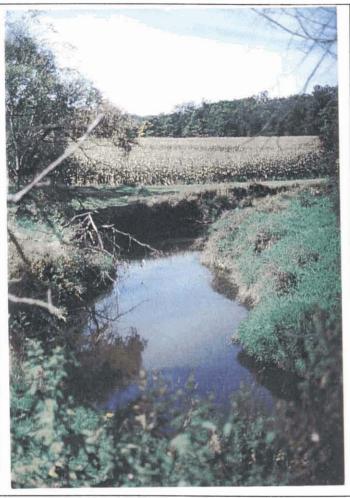
Photograph 14 RM 1.9 @ Bear Hollow Road



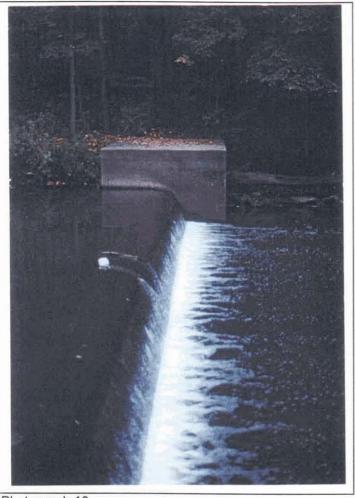
Photograph 15
Sand and gravel mining along the banks of the Middle Fork is a likely source of downstream sedimentation. This operation is located in the City of Lisbon.



Photograph 16
Construction of this access road at the Salem Industrial Park has resulted in channel modification and increased erosion.



Photograph 17
In some areas, intensive agriculture encroaches upon the riparian zone and can lead to increased erosion and sediment deposition.



Photograph 18
Barriers such as the Lisbon Dam restrict the free movement of fish and can impact migratory species such as smallmouth bass.

## APPENDIX C

OEPA Biocriteria Data Sheets

Macroinvertebrate Data Sheets (ICI)

Middle Fork Little Beaver Creek, 1999

	Drainage		Nı	ımber of			F	Percent:					
River Mile	Area (sq mi)	Total Taxa	Mayfiy Taxa	Caddisfly Taxa	Dipteran Taxa	Mayflies	Caddis- flies	Tany- tarsini	Other Dipt/NI	Tolerant Organisms	Qual. EPT	Eco- region	ICI
Middle Fo	ork Little Be	aver Cr	eek (08-)	200)									
Year: 199	9												
40.30	1.7	25(4)	2(0)	0(0)	10(2)	1.1(2)	0.0(0)	0.0(0)	97.8(0)	81.7(0)	5(2)	3	10
37.70	6.1	35(4)	2(0)	4(6)	20(6)	0.1(2)	8.0(6)	3.5(2)	88.0(0)	37.9(0)	5(2)	3	28
36.70	8.3	35(4)	1(0)	4(6)	16(4)	0.2(2)	49.3(6)	3.1(2)	42.4(4)	15.1(4)	3(0)	3	32
33.30	17.9	28(4)	1(0)	4(6)	16(4)	12.8(4)	60.4(6)	3.5(2)	21.8(6)	1.1(6)	5(2)	3	40
32.00	18.9	33(4)	3(2)	3(6)	15(4)	4.0(2)	11.6(6)	46.6(6)	33.7(4)	8.9(4)	6(2)	3	40
28.80	26.0	34(4)	2(0)	3(6)	18(4)	3.1(2)	5.9(4)	50.7(6)	22.5(6)	4.8(6)	4(2)	3	40
25.80	32.0	30(4)	3(2)	2(4)	19(4)	1.4(2)	14.3(6)	20.8(4)	61.0(2)	16.0(2)	4(0)	3	30
23.50	36.0	34(4)	1(0)	5(6)	20(6)	4.6(2)	10.3(6)	33.7(6)	51.3(2)	2.9(6)	4(0)	3	38
21.80	41.0	39(6)	2(0)	5(6)	22(6)	6.5(2)	60.2(6)	16.3(4)	14.6(6)	2.3(6)	6(2)	3	44
20.90	73.0	46(6)	4(2)	3(4)	24(6)	3.4(2)	2.0(2)	12.2(2)	70.8(0)	16.8(2)	4(0)	3	26
. 15.00	96.0	26(4)	4(2)	4(6)	12(2)	27.7(4)	28.3(6)	35.4(6)	7.4(6)	1.5(6)	6(2)	3	44
10.70	112.0	36(4)	8(4)	3(4)	14(4)	3.3(2)	24.2(6)	26.6(4)	44.8(2)	7.0(4)	9(2)	3	36
10.00	112.0	36(4)	7(4)	5(6)	14(4)	4.0(2)	35.8(6)	23.8(4)	35.6(4)	8.4(4)	10(4)	4	42
9.00	114.0	29(4)	5(2)	5(6)	11(2)	3.9(2)	23.9(6)	39.8(6)	31.6(4)	1.6(6)	8(2)	4	40
8.40	125.0	41(6)	7(4)	6(6)	17(4)	4.6(2)	21.5(6)	46.8(6)	25.9(6)	3.4(6)	12(4)	4	50
4.40	138.0	36(4)	9(6)	4(4)	16(4)	28.1(4)	7.2(2)	30.7(4)	32.6(4)	6.8(4)	11(4)	4	40
1.90	141.0	33(4)	6(4)	5(6)	13(4)	21.2(4)	2.5(2)	48.4(6)	27.0(6)	6.6(4)	9(2)	4	42

Fish Biocriteria Data Sheets (Modified  $I_{wb}$  & IBI)

			-			Numb	er of				Perce	nt of Individu	uals		Rel.No.	
River Mile	Туре	Date	Drainage area (sq mi)	Total species	Minnow I species	leadwater species	Sensitive species	Darter & Sculpin species	Simple	Tolerant fishes	Omni- I vores	Pioneering fishes	Insect-	DELT anomalies	minus tolerants /(0.3km)	IBI
Л. Fk. L	. Beaver	Cr (08-	200)													
Year: 19	999															
40.30	Е	07/12/199	99 1.7	10(5)	4(3)	2(3)	0(1)	1(3)	2(3)	91(1)	28(1)	47(3)	9(1	0.0(5)	86(3)	. 32
40.30	Е	08/23/199	99 1.7	8(5)	4(3)	2(3)	0(1)	1(3)	2(3)	95(1)	47(1)	62(1)	5(1	0.0(5)	104(3)	30
38.20	Е	07/12/199	99 4.2	12(5)	6(5)	2(3)	0(1)	1(1)	2(1)	39(3)	10(5)	32(3)	2(1	0.3(3)	896(5)	36
38.20	E	08/24/199	99 4.2	14(5)	6(5)	2(3)	0(1)	2(3)	2(1)	83(1)	38(1)	37(3)	4(1	0.0(5)	428(5)	34
37.70	D	07/12/199	99 6.1	13(5)	5(3)	2(3)	0(1)	2(3)	2(1)	77(1)	52(1)	32(3)	8(1	0.3(5)	119(1)	28
37.70	D	08/23/199	99 6.1	11(3)	6(5)	2(3)	0(1)	2(3)	2(1)	72(1)	46(1)	37(3)	17(1	0.5(3)	182(3)	28
36.70	D	07/13/199	99 8.3	12(3)	6(3)	3(3)	0(1)	3(3)	3(3)	65(1)	43(1)	33(3)	7(1	0.0(5)	206(3)	30
36.70	D	08/23/199	99 8.3	12(3)	7(5)	2(3)	0(1)	2(3)	3(3)	69(1)	32(1)	45(3)	5(1	0.2(5)	266(3)	32
33.30	D	07/13/199	99 17.9	14(3)	6(3)	2(3)	3(1)	4(3)	6(3)	35(3)	14(5)	27(5)	21(1	0.9(3)	455(3)	36
33.30	D	08/24/199	99 17.9	15(3)	6(3)	2(3)	3(1)	4(3)	6(3)	42(3)	16(5)	29(5)	16(1	0.6(3)	684(3)	36
32.00	D	08/24/199	99 18.9	14(3)	7(5)	2(3)	2(1)	3(3)	5(3)	43(3)	19(3)	29(5)	10(1	0.2(3)	720(3)	. 36
32.00	D	07/13/199	99 18.9	13(3)	6(3)	2(3)	2(1)	3(3)	5(3)	32(3)	12(5)	19(5)	8(1	0.2(3)	651(3)	36

<sup>▲ -</sup> IBI is low end adjusted.

<sup>\* - &</sup>lt; 200 Total individuals in sample

<sup>\*\* - &</sup>lt; 50 Total individuals in sample

<sup>•</sup> One or more species excluded from IBI calculation.

						Number	of			P	ercent of	Individuals			Rel.No.		
River Mile	Туре	Date	Drainage area (sq mi)	Total species	Sunfish species	Sucker species	Intolerant species	Darter species	Simple Lithophils	Tolerant fishes	Omni- vores	Top carnivores	Insect- ivores	DELT anomalies	minus tolerants 3 /(0.3km)	IBI	Modified lwb
M. Fk. I	Beav	er Cr (	08200)														
Year:	1999																
28.8	0 D	08/24/19	99 26	19(5)	4(5)	2(3)	0(1)	2(3)	51(5)	75(1)	53(1)	5.6(5)	36(3)	9.0(1)	87(1)	34	5.8
25.8	0 D	08/24/19	99 32	17(3)	4(5)	2(3)	0(1)	3(3)	52(5)	62(1)	55(1)	12.8(5)	29(3)	13.4(1)	86(1)	32	5.9
25.8	0 D	07/14/19	99 32	13(3)	3(3)	2(3)	0(1)	2(1)	53(5)	66(1)	60(1)	5.0(3)	32(3)	5.4(1)	37(1)	* 26	5.1
23.5	0 D	08/25/19	99 36	17(3)	3(3)	2(3)	0(1)	4(3)	47(5)	42(3)	22(3)	3.6(3)	45(3)	0.0(5)	173(1)	36	7.6
23.5	0 D	07/14/19	99 36	17(3)	3(3)	2(3)	0(1)	3(3)	28(3)	16(5)	12(5)	1.3(3)	40(3)	0.0(5)	192(1)	38	6.3
21.8	0 D	08/25/19	99 41	18(3)	2(3)	2(3)	0(1)	4(3)	38(5)	45(3)	36(1)	7.2(5)	36(3)	0.0(5)	252(3)	38	8.1
21.8	0 D	07/14/19	99 41	15(3)	1(1)	2(3)	0(1)	4(3)	39(5)	33(3)	27(3)	6.8(5)	55(5)	1.2(3)	179(1)	36	7.4
20.9	0 D	08/25/19	99 73	14(3)	6(5)	2(3)	0(1)	1(1)	22(3)	22(5)	14(5)	28.7(5)	57(5)	1.6(1)	121(1)	* 38	7.6
15.0	0 D	08/25/19	99 96	14(3)	1(1)	2(3)	0(1)	4(3)	28(3)	18(5)	12(5)	1.2(3)	54(3)	0.3(3)	741(3)	36	8.1
15.0	0 D	07/15/19	99 96	13(3)	1(1)	2(3)	0(1)	4(3)	32(3)	13(5)	10(5)	0.6(1)	79(5)	0.0(5)	467(3)	38	7.3
4.4	0 D	08/26/19	99 138	26(5)	3(3)	4(3)	6(5)	4(3)	57(5)	9(5)	13(5)	4.1(3)	80(5)	0.3(3)	458(3)	48	9.4
4.4	0 D	07/15/19	99 138	20(3)	3(3)	5(5)	3(3)	4(3)	54(5)	19(5)	21(3)	9.8(5)	62(5)	2.9(1)	113(1)	* 42	8.3
1.9	0 D	08/26/19	99 141	28(5)	3(3)	6(5)	5(3)	3(3)	71(5)	10(5)	9(5)	5.3(5)	83(5)	1.1(3)	359(3)	50	9.5
1.9	0 D	07/15/19	99 141	27(5)	3(3)	5(5)	6(5)	3(3)	69(5)	9(5)	14(5)	1.6(3)	81(5)	0.5(3)	251(3)	50	9.1

na - Qualitative data, Modified Iwb not applicable.

<sup>▲ -</sup> IBI is low end adjusted.

<sup>\* - &</sup>lt; 200 Total individuals in sample

<sup>\*\* - &</sup>lt; 50 Total individuals in sample

One or more species excluded from IBI calculation.

Middle Fork Little Beaver Creek

						Number	of			P	ercent of	Individuals			Rel.No. minus		
River Mile	Type	Date	Drainage area (sq mi)	Total species	Sunfish species	Sucker species	Intolerant species	Darter species	Simple Lithophils	Tolerant fishes	Omni- vores	Top carnivores	Insect- ivores	DELT anomalies	tolerants	IBI	Modified lwb
M. Fk. L.	. Beav	er Cr (0	08200)														
Year:	1999								-								
10.90	0 D	08/05/19	99 105	28(5)	3(3)	5(5)	4(3)	5(3)	52(5)	11(5)	27(3)	1.5(3)	59(5)	0.1(3)	987(5)	48	10.0
10.90	0 D	08/25/19	99 105	25(5)	2(3)	5(5)	5(3)	4(3)	52(5)	13(5)	26(3)	2.6(3)	64(5)	0.1(5)	944(5)	50	9.9
9.90	0 D	08/05/19	99 112	29(5)	1(1)	4(3)	5(3)	6(5)	44(5)	11(5)	14(5)	1.9(3)	68(5)	0.4(3)	1260(5)	48	10.2
9.90	0 D	08/25/19	99 112	26(5)	2(3)	4(3)	4(3)	4(3)	46(5)	15(5)	21(3)	1.7(3)	65(5)	0.0(5)	1479(5)	48	10.1
9.00	0 D	07/28/19	99 114	29(5)	2(3)	5(5)	6(5)	6(5)	40(5)	23(3)	21(3)	2.6(3)	70(5)	0.1(3)	860(5)	50	9.5
9.00	0 D	08/25/19	99 114	26(5)	1(1)	3(3)	5(3)	4(3)	36(3)	23(3)	29(3	3.4(3)	59(5)	0.1(3)	792(5)	40	9.8
8.40	0 D	07/28/19	99 125	25(5)	3(3)	3(3)	4(3)	4(3)	36(5)	18(5)	16(5	1.5(3)	56(5)	0.0(5)	1064(5)	50	9.1
8.40	0 D	08/25/19	99 125	29(5)	3(3)	3(3)	4(3)	6(5)	38(5)	22(3)	20(3	2.2(3)	56(5)	0.5(3)	968(5)	46	9.6

na - Qualitative data, Modified Iwb not applicable.

<sup>▲ -</sup> IBI is low end adjusted.

<sup>\* - &</sup>lt; 200 Total individuals in sample

<sup>\*\* - &</sup>lt; 50 Total individuals in sample

One or more species excluded from IBI calculation.

River Code: 08-200 River Mile: 40.30 Data Source: 01 Purpose:	Basin	: Li Fishe	ttle Bod: 30	eaver C 51 sec	reek Drai	aver Creek n Area: 1.7 th: 20 cm	sq mi	1	Date: 07 Sample: Type: E	7/12/1999
Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		ı	С	T	1	2.00	0.21			
White Sucker	W	0	S	7.	37	74.00	7.86			
Blacknose Dace						352.00	37.37			
Creek Chub	N	G	N	Т	118	236.00	25.05			
Bluntnose Minnow	N	0	С	Т	95	190.00	20.17			
Central Stoneroller	N	Н	N		4	8.00	0.85			
Green Sunfish	s	1	С	T	1	2.00	0.21			
Pumpkinseed Sunfish	s	I	С	Р	1	2.00	0.21			
Johnny Darter	D	1	C		6	12.00	1.27			
Brook Stickleback		l	С		32	64.00	6.79			
Date Total Number of Species Number of Hybrids					47 <b>1</b> 10 0	942.00				

River Code: 08-200 River Mile: 40.30				Fork : eaver (	Little Bo Creek		Sample	Date: 08	3/23/1999	
Data Source: 01	Time	Fishe	d: 34	17 sec	Dra	in Area: 1.7	sq mi	Invalid	Sample:	
Purpose:	Dist F	ished	: 0.1	5 km	Dep	th: 10 cm	Flow: C	Sample	r Type: E	
Species IBI Feed Breed Name / ODNR status Grp Guild Guild T					# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	0	s	T	16	32.00	1.54			
Blacknose Dace	N	G	S	Т	342	684.00	32.92			
Creek Chub	N	G	N	T	162	324.00	15.59			
Bluntnose Minnow	N	0	С	Т	467	934.00	44.95			
Central Stoneroller	N	н	N		1	2.00	0.10			
Pumpkinseed Sunfish	s	- 1	С	P	1	2.00	0.10			
Johnny Darter	D	- 1	С		14	28.00	1.35			
Brook Stickleback		-1	С		36	72.00	3.46			
	Date 7	otal			1,039	2,078.00				
	Numb	er of S	Specie	es	8					
	Numb	er of I	Hybrid	ls	0					

					aver Creek		,		)99 12/1999
Time	Fishe	d: 64	68 sec	Drai		-	Т	'hru: 08/	23/1999
				# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
	i	С	Т	1	1.00	0.07			
W	0	S	Т	53	53.00	3.51			
N	G	S	T	518	518.00	34.30			
N	G	N	T	280	280.00	18.54			
N	0	С	Ŧ	562	562.00	37.22			
N	Н	Ν		5	5.00	0.33			
S	- 1	С	T	1	1.00	0.07			
\$	1	С	Р	2	2.00	0.13			
D	1	С		20	20.00	1.32			
	- 1	С		68	68.00	4.50			
Mile Total Number of Species Number of Hybrids					1,510.00				
	Basin Time Dist F IBI Grp W N N N S S D	Basin: Lift Time Fished Dist Fished  IBI Feed Grp Guild  I W O N G N G N O N H S I S I D I I Mile Total Number of S	Basin: Little Bot Time Fished: 64 Dist Fished: 0.3  IBI Feed Breed Grp Guild Guild  I C W O S N G S N G N N O C N H N S I C S I C D I C Mile Total Number of Specie	Basin: Little Beaver of Time Fished: 6468 sec Dist Fished: 0.30 km  IBI Feed Breed Grp Guild Guild Tol  I C T W O S T N G S T N G N T N O C T N H N S I C T S I C P D I C I C Mile Total Number of Species	Basin: Little Beaver Creek           Time Fished:         6468 sec         Drain           Dist Fished:         0.30 km         No colspan="3">No colspan	Basin: Little Beaver Creek           Time Fished:         6468 sec         Drain Area: 1.7           Dist Fished:         0.30 km         No of Passes:         2           IBI Feed Breed Grp Guild Guild Tol Fish Number           ICT         1         1.00           WOST         53         53.00           NGST         518         518.00           NGNT         280         280.00           NGNT         280         280.00           NGNT         5         5.00           NGNT         1         1.00           NGNT         280         280.00           NGNT         1         1           NGNT         1         2           NGNT         280         280.00           NGNT         1         1           NGNT         1         1	Time Fished:         6468 sec Dist Fished:         Drain Area:         1.7 sq mi No of Passes:         2           IBI Feed Breed Grown Guild Guild Tol         # of Fish Number         Relative Number         % by Number           I C T 1 1 1.00 0.07         0.07           W O S T 53 53.00 3.51         3.51           N G S T 518 518.00 34.30         34.30           N G N T 280 280.00 18.54         37.22           N H N 5 5.00 0.33         5.00 0.33           S I C T 1 1 1.00 0.07         0.07           S I C P 2 2.00 0.13         0.13           D I C 20 20.00 1.32         4.50           Mile Total Number of Species         10	Basin: Little Beaver Creek         Date Ra           Time Fished: 6468 sec         Drain Area: 1.7 sq mi         T           Dist Fished: 0.30 km         No of Passes: 2         Sampler           IBI Feed Breed Grp Guild Guild Tol Fish Number Grp Guild Guild Tol Fish Number Weight         # of Relative Number Number Weight         % by Relative Weight           N O S T 53 53.00         3.51           N G S T 518 518.00         34.30           N G N T 280 280.00         18.54           N O C T 562 562.00         37.22           N H N 5 5.00         0.33           S I C T 1 1 1.00         0.07           S I C P 2 2.00         0.13           D I C 20 20.00         1.32           I C 68 68.00         4.50           Mile Total Number of Species         10	Basin: Little Beaver Creek   Time Fished: 6468 sec   Drain Area: 1.7 sq mi   Thru: 08/2

River Code: 08-200 River Mile: 38.20	Stream Basin			Fork I eaver C		eaver Creek		Sample	Date: 07	7/12/1999
Data Source: 01	Time	Fishe	d: 252	22 sec	Drai	n Area: 4.2	sq mi	Invalid	Sample:	
Purpose:	Dist F	ished	: 0.1	6 km	Dep	th: 15 cm	Flow: C	Samplei	Type: E	
Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	0	s	Т	37	69.38	4.76			
Golden Shiner	N	ŀ	M	T	1	1.88	0.13			
Blacknose Dace	N	Ġ	S	Т	13	24.38	1.67			
Creek Chub	N	G	N	Т	208	390.00	26.74			
Fathead Minnow	N	0	С	T	31	58.13	3.98			
Bluntnose Minnow	N	0	С	Т	6	11.25	0.77			
Central Stoneroller	N	Н	N		470	881.25	60.41			
Yellow Bulihead		1	C	Ŧ	4	7.50	0.51			
Bluegill Sunfish	s	1	С	P	1	1.88	0.13			
Pumpkinseed Sunfish	s	1	C	Þ	3	5.63	0.39			
Johnny Darter	D	1	С		3	5.63	0.39			
Brook Stickleback	•						0.13			
	?s	778 12	1,458.75							
	Numb	er of F	Tybrid	S	0					

		I		_								
River Code: 08-200 River Mile: 38.20	1	Stream: Middle Fork Little Beaver Creek Basin: Little Beaver Creek Time Fished: 3672 sec Drain Area: 4.2 sq mi										
Data Source: 01 Purpose:	Time Fished: 3672 sec Dist Fished: 0.16 km	1	Sample: r Type:									
Species Name / ODNR status	IBI Feed Breed Grp Guild Guild Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) t Weight					
Central Mudminnow	l C T	2	3.75	0.15								

Species Name / ODNR status	IBI Grp	Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		l	С	Т	2	3.75	0.15		· · · · · · · · · · · · · · · · · · ·	<del></del>
White Sucker	W	О	s	Ŧ	443	830.63	33.89			
Golden Shiner	N	- 1	М	Т	6	11.25	0.46			
Blacknose Dace	N	G	s	Т	173	324.38	13.24			
Creek Chub	N	G	N	Т	401	751.88	30.68			
Fathead Minnow	N	0	C	Т	41	76.88	3.14			
Bluntnose Minnow	N	0	С	T	6	11.25	0.46			
Central Stoneroller	N	Н	N		192	360.00	14.69			
Yellow Bullhead		I	С	τ	1	1.88	0.08			
Green Sunfish	s	- 1	С	Т	6	11.25	0.46			
Bluegill Sunfish	s	ı	С	Р	4	7.50	0.31			
Pumpkinseed Sunfish	s	1	С	P	4	7.50	0.31			
Johnny Darter	D	1	С		27	50.63	2.07			
Fantail Darter	D	1	С		1	1.88	0.08			
·	Date Total		1,307	2,450.63						
	Number of Species			14	•					
	Number of Hybrids				σ					

River Code: 08-200 River Mile: 38.20	Basin	: Li Fishe	ttle Bo	eaver ( 94 sec	Creek Dra	eaver Creek in Area: 4.2 of Passes: 2	sq mi		inge: 07/	12/1999 24/1999
Species Name / ODNR status			Bree Guild		# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		- 1	С	T	2	1.88	0.10	, <u></u>		
White Sucker	W	0	s	Т	480	450.00	23.02			
Golden Shiner	N	- 1	М	T	7	6.56	0.34			
Blacknose Dace	N	G	S	Т	18 <del>6</del>	174.38	8.92			
Creek Chub	N	G	N	T	609	570.94	29.21			
Fathead Minnow	N	0	С	Т	72	67.50	3.45			
Bluntnose Minnow	N	0	С	T	12	11.25	0.58			
Central Stoneroller	N	Н	N		662	620.63	31.75			
Yellow Bullhead		1	С	Т	5	4.69	0.24			
Green Sunfish	s	- 1	С	Т	6	5.63	0.29			
Bluegill Sunfish	s	1.	С	Р	5	4.69	0.24			
Pumpkinseed Sunfish	s	1	С	P	7	6.56	0.34		•	
Johnny Darter	D	1	С		30	28.13	1.44			•
Fantail Darter	D	1	С		1	0.94	0.05			
Brook Stickleback		- 1	С		1	0.94	0.05			
	Mile T	otal			2,085	1,954.69				
	Numb		Specie	es	15	,				
	Numb		•		0					
			,							

River Code: 08-200	Stream	n: Mi	iddle	Fork I	∡ittle Be	aver Creek		Sample	Date: 07	7/12/1999
River Mile: 37.70	Basin	: Lit	ttle Be	eaver C	reek					
Data Source: 01	Time	Fishe	d: 209	97 sec	Drain	n Area: 6.1	sq mi	Invalid	Sample:	
Purpose:	Dist F	ished	: 0.2	0 km	Dept	h: 25 cm	Flow: C	Sample	r Type: D	
Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	0	S	T	136	204.00	39.88			
Blacknose Dace	N	G	S	T	25	37.50	7.33			
Creek Chub	N	G	N	T	55	82.50	16.13			
Fathead Minnow	N	0	С	T	17	25.50	4.99			
Bluntnose Minnow	N	0	С	T	24	36.00	7.04			
Central Stoneroller	N	Н	Ν		55	82.50	16.13			
Yellow Bullhead		1	С	Ţ	3	4.50	0.88			
Largemouth Bass	F	С	С		1	1.50	0.29			
Green Sunfish	s	ı	С	Т	2	3.00	0.59			
Bluegill Sunfish	s	I	С	P	8	12.00	2.35			
Pumpkinseed Sunfish	s	1	С	Ρ	4	6.00	1.17			
Johnny Darter	D	1	С		10	15.00	2.93			
Mottled Sculpin		1	С		1	1.50	0.29			
	Date 1	Total			341	511.50				
	Numb	er of S	Specie	s	13					
	Numb				0					

River Code: 08-200 River Mile: 37.70	Basin	: Li	ttle Be	Fork I	Sample Date: 08/23/1999 Invalid Sample:					
Data Source: 01	4	Time Fished: 2150 sec				n Area: 6.1	•		-	
Purpose:	Dist F	Dist Fished: 0.20 km			рерг	h: 30 cm	Flow: C	Sampler Type: D		
Species Name / ODNR status		IBI Feed Breed Grp Guild Guild Tol				Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	0	S	T	173	259.50	39.77			
Blacknose Dace	N	G	S	T	33	49.50	7.59			
Creek Chub	N	G	N	T	82	123.00	18.85			
Silverjaw Minnow	N	i	М		4	6.00	0.92			
Fathead Minnow	N	0	С	Т	6	9.00	1.38			
Bluntnose Minnow	N	0	С	T	20	30.00	4.60			
Central Stoneroller	N	Н	N		47	70.50	10.80			
Bluegill Sunfish	s	1	С	Ρ	11	16.50	2.53			
Pumpkinseed Sunfish	s	1	С	Р	3	4.50	0.69			
Johnny Darter	D	1	С		48	72.00	11.03			
Fantail Darter	D	1	С		8	12.00	1.84			
	Date 1	otal			435	652.50				
	Numb	er of S	Specie	es	11			`		
	Numb		•		0					

River Code: 08-200 River Mile: 37.70	Basin Time	: Li Fishe	ttle Bod: 42	Fork I eaver C 47 sec 40 km	reek Drai	aver Creek n Area: 6.1 of Passes: 2	sq mi	Sample Date: 1999     Date Range: 07/12/1999     Thru: 08/23/1999     Sampler Type: D			
Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight	
White Sucker	w	O	s	T	309	231.75	39.82				
Blacknose Dace	N	G	S	Т	58	43.50	7.47				
Creek Chub	N	G	Ν	Т	137	102.75	17.65				
Silverjaw Minnow	N	Į.	М		4	3.00	0.52				
Fathead Minnow	N	0	С	Т	23	17.25	2.96				
Bluntnose Minnow	N	0	С	Т	44	33.00	5.67				
Central Stoneroller	N	Н	N		102	76.50	13.14				
Yellow Bullhead		1	С	T	3	2.25	0.39				
Largemouth Bass	F	С	С		1	0.75	0.13				
Green Sunfish	s	1	С	T	2	1.50	0.26				
Bluegill Sunfish	s	1	С	Р	19	14.25	2.45				
Pumpkinseed Sunfish	s	1	С	Р	- 7	5.25	0.90				
Johnny Darter	D	ı	С		58	43.50	7.47				
Fantail Darter	D	1	С		8	6.00	1.03				
Mottled Sculpin		1	С		1	0.75	0.13				
	Mile T	otal			776	582.00					
	Numb	er of S	Specie	es	15						
	Numb	er of i	Hybrid	ls .	0						

River Code: 08-200 River Mile: 36.70 Data Source: 01 Purpose:	Basin	: Lit Fishe	tle Bo d: 36	eaver C 06 sec	reek Drai	aver Creek n Area: 8.3 th: 30 cm		Sample Date: 07/13/1999  Invalid Sample: Sampler Type: D			
Species Name / ODNR status		IBI Feed Breed Grp Guild Guild Tol				Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight	
White Sucker	W	0	s	Т	133	199.50	33.59				
Blacknose Dace	N	G	s	T	8	12.00	2.02				
Creek Chub	N	G	N	Т	78	117.00	19.70				
Striped Shiner	N	ı	S		1	1.50	0.25				
Fathead Minnow	N	0	С	T	10	15.00	2.53				
Bluntnose Minnow	N	0	С	Т	28	42.00	7.07				
Central Stoneroller	· N	Н	N		112	168.00	28.28				
Green Sunfish	s	1	С	T	2	3.00	0.51				
Bluegill Sunfish	S	į	С	P	4	6.00	1.01				
Johnny Darter	D	1	C		11	16.50	2.78				
Fantail Darter	D	i	С		2	3.00	0.51				
Mottled Sculpin		1	C		7	10.50	1.77				
	Date 1 Numb Numb	er of S	•		396 12 0	594.00					

River Code: 08-200 River Mile: 36.70	Stream			Fork L eaver C		aver Creek		Sample Date: 08/23/1999			
Data Source: 01	Time Fished: 2627 sed Dist Fished: 0.20 km			27 sec	Drai	n Area: 8.3 h: 40 cm	sq mi Flow: C	1	Sample: Type: D		
Purpose:	Dist	Dist Fished. 0.20 kill			Бері	.11. 40 CIII	110W. C	Sample	Type. D		
Species Name / ODNR status		IBI Feed Breed Grp Guild Guild Tol				Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight	
White Sucker	W	0	s	T	117	175.50	20.28				
Blacknose Dace	N	G	s	Т	41	61.50	7.11				
Creek Chub	N	Ģ	N	T	171	256.50	29.64				
Striped Shiner	N	l	s		1	1.50	0.17				
Silverjaw Minnow	N	1	М		1	1.50	0.17	•			
Fathead Minnow	N	0	C	T	27	40.50	4.68				
Bluntnose Minnow	N	0	С	T	43	64.50	7.45				
Central Stoneroller	, N	Н	N		150	225.00	26.00				
Green Sunfish	s	1	С	Т	1	1.50	0.17				
Bluegill Sunfish	s	ı	C	P	4	6.00	0.69				
Johnny Darter	D	1	C		15	22.50	2.60				
Mottled Sculpin		I	С		6	9.00	1.04				
	Date 1	Total			577	865.50					
	Numb	er of S	Бресів	25	12						
	Numb	er of F	lybria	<b>'</b> \$	0						

River Code: 08-200 River Mile: 36.70	Basin	: Li	ttle B	Fork I eaver C 33 sec	Sample Date Ra	inge: 07/	199 13/1999			
	1			10 km		n Area: 8.3 : of Passes: 2	•	Thru: 08/23/1999 Sampler Type: D		
Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	0	s	Т	250	187.50	25.69			
Blacknose Dace	N	G	s	Т	49	36.75	5.04			
Creek Chub	N	G	N	T	249	186.75	25.59			
Striped Shiner	N	1	S		2	1.50	0.21			
Silverjaw Minnow	N	1	М		1	0.75	0.10			
Fathead Minnow	Ν	0	С	Т	37	27.75	3.80			
Bluntnose Minnow	N	0	С	Т	71	53.25	7.30			
Central Stoneroller	N	Н	Ν		262	196.50	26.93			
Green Sunfish	s	1	С	T	3	2.25	0.31			
Bluegill Sunfish	s	1	С	P	8	6.00	0.82			
Johnny Darter	D	1	С		26	19.50	2.67			
Fantail Darter	D	1	С		2	1.50	0.21			
Mottled Sculpin		1	С		13	9.75	1.34			
	Mile T	otal			973	729.75				
	Numb	er of S	Specie	es	13					
	Numb				0					

River Code: 08-200 River Mile: 33.30	Stream Basin			Fork I	.ittle Be reek		Sample	Date: 07	7/13/1999	
Data Source: 01	Time	Fishe	d: 36	06 sec	Drai	n Area: 17.9	g mi	Invalid	Sample:	
Purpose:	Dist I	Dist Fished: 0.20 km			Dept	th: 50 cm	Flow: C	Sample	r Type: D	
Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	i	S	М	1	1.50	0.22			
White Sucker	W	0	s	T	40	60.00	8.62			
Common Carp	G	0	М	T	4	6.00	0.86			
Blacknose Dace	N	G	S	T	22	33.00	4.74			
Creek Chub	N	G	N	T	71	106.50	15.30			•
Striped Shiner	N	l	Ş		3	4.50	0.65			
Fathead Minnow	N	0	C	Т	1	1.50	0.22			
Bluntnose Minnow	N	- 0	С	T	18	27.00	3.88			
Central Stoneroller	N	Н	Ν		209	313.50	45.04			
Yellow Bullhead		ı	С	Т	3	4.50	0.65			
Green Sunfish	\$	1	С	T	2	3.00	0.43			
Johnny Darter	D	ı	C		31	46.50	6.68			
Greenside Darter	D	I	s	М	5	7.50	1.08			
Rainbow Darter	D	1	s	M	2	3.00	0.43			
Mottied Sculpin		1	С		52	78.00	11.21			
	Date	Total			464	696.00				
	Numb	er of S	Specie	es	15					
		er of l	•		0					

River Code: 08-200 River Mile: 33.30	Strear Basin			Fork I eaver C	Little Bo Freek	(	Sample	Date: 0	8/24/1999		
Data Source: 01	Time	Fishe	d: 32	95 sec	Dra	in Area: 17.	9 sq mi	Invalid	Sample:		
Purpose:	Dist Fished: 0.20 km				Depth: 40 cm Flow: C			Sample	Sampler Type: D		
Species			Bree		# of	Relative	% by	Relative	% by	Ave(gm)	
Name / ODNR status	Grp	Guild	Guild	l Tol	Fish	Number	Number	Weight	Weight	Weight	
Northern Hog Sucker	R	1	S	M	3	4.50	0.38				
White Sucker	W	0	S	Т	85	127.50	10.88				
Blacknose Dace	N	G	S	Т	64	96.00	8.19				
Creek Chub	N	G	N	Τ	126	189.00	16.13				
Striped Shiner	N	1	S		9	13.50	1.15				
Fathead Minnow	N	0	С	T	1	1.50	0.13				
Bluntnose Minnow	N	0	С	Т	40	60.00	5.12				
Central Stoneroller	N	Н	N		338	507.00	43.28				
Yellow Bullhead		ı	C	Т	3	4.50	0.38				
Green Sunfish	S	1	С	Т	6	9.00	0.77				
Pumpkinseed Sunfish	s	- 1	Ç	Р	2	3.00	0.26				
Green Sf X Pumpkinseed					1	1.50	0.13				
Johnny Darter	D	1	С		53	79.50	6.79				
Greenside Darter	D	F	S	М	5	7.50	0.64				
Rainbow Darter	D	I	s	М	1	1.50	0.13				
Mottled Sculpin		I	С		44	66.00	5.63				
	Date 1	Total			781	1,171.50					
•	Numb		Specie	95	15	•					
	Numb		•		1						

D' C. L. 00 300	Character Middle Early Little Berryen Creek	Sample Date: 1999
River Code: 08-200	Stream: Middle Fork Little Beaver Creek	1 *
River Mile: 33.30	Basin: Little Beaver Creek	Date Range: 07/13/1999
	Time Fished: 6901 sec Drain Area: 17.9 sq mi	Thru: 08/24/1999
	Dist Fished: 0.40 km No of Passes: 2	Sampler Type: D

Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
		Guild						vveign	v veignt	vveigni
Northern Hog Sucker	R		S	M	4	3.00	0.32			
White Sucker	W	0	S	T	125	93.75	10.04			
Common Carp	G	0	М	Т	4	3.00	0.32			
Blacknose Dace	N	G	S	T	86	64.50	6.91			
Creek Chub	N	G	N	Т	197	147.75	15.82			
Striped Shiner	N	1	s		12	9.00	0.96			
Fathead Minnow	N	О	С	Т	2	1.50	0.16			
Bluntnose Minnow	N	0	С	T	58	43.50	4.66			
Central Stoneroller	N	Н	N		547	410.25	43.94			
Yellow Bullhead		1	С	Т	6	4.50	0.48			
Green Sunfish	s	1	С	T	8.	6.00	0.64			
Pumpkinseed Sunfish	s	ſ	С	Р	2	1.50	0.16			
Green Sf X Pumpkinseed					1	0.75	0.08			
Johnny Darter	D	1	С		84	63.00	6.75			
Greenside Darter	D	- 1	s	М	10	7.50	0.80			
Rainbow Darter	D	I	s	М	3	2.25	0.24			
Mottled Sculpin		1	С		96	72.00	7.71			
	Mile T	otal			1,245	933.75				
•	Numb	er of S	Specie	e <i>s</i>	16					
		er of F	,		1					

River Code: 08-200 River Mile: 32.00	Stream Basin			Fork L eaver C	ittle Be reek		Sample	Date: 0	7/13/1999		
Data Source: 01 Purpose:	1	Fishe	đ: 22	65 sec 80 km	Drain	n Area: 18.9 h: 40 cm	9 sq mi Flow: C	1	Invalid Sample: Sampler Type: D		
Species Name / ODNR status	IBI	Feed Guild	Bree	d t	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight	
Northern Hog Sucker	R	í	s	М	5	7.50	0.79	0.26	3.14	34.00	
White Sucker	W	0	s	Т	32	48.00	5.04	1.82	22.34	37.83	
Blacknose Dace	N	G	s	T	65	97.50	10.24	0.45	5.47	4.56	
Creek Chub	N	G	N	T	61	91.50	9.61	1.47	18.03	16.02	
Striped Shiner	N	ı	s		6	9.00	0.94	0.13	1.54	13.83	
Silverjaw Minnow	N	1	М		1	1.50	0.16	0.01	0.07	4.00	
Bluntnose Minnow	Ń	0	С	T	41	61.50	6.46	0.28	3.39	4.49	
Central Stoneroller	N	Н	N		384	576.00	60.47	3.25	39.91	5.63	
Yellow Bullhead		Į	С	T	2	3.00	0.31	0.23	2.83	76.50	
Pumpkinseed Sunfish	s	ŀ	С	P	1	1.50	0.16	0.02	0.26	14.00	
Johnny Darter	D	1	С		20	30.00	3.15	0.06	0.70	1.89	
Greenside Darter	D	1	s	М	10	15.00	1.57	0.07	0.84	4.50	
Mottled Sculpin		- 1	С		7	10.50	1.10	0.12	1.51	11.71	
	Date Numb Numb	er of S	•		635 13 0	952.50		8.13			

River Code: <b>08-200</b> River Mile: <b>32.00</b>	Stream Basin:			Fork I eaver C	Sample Date: 08/24/1999							
Data Source: 01	Time	Fishe	d: 38	17 sec	Drai:	n Area: 18.9	9 sq mi	Invalid	Sample:			
Purpose:	Dist Fished: 0.20 km				Dept	th: 30 cm	Flow: C	Sample	Sampler Type: D			
Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight		
Northern Hog Sucker	R	i	s	М	7	10.50	0.83	0.53	5.68	50.86		
White Sucker	W	0	s	Т	94	141.00	11.19	2.07	22.00	14.66		
Blacknose Dace	N	G	S	Т	73	109.50	8.69	0.39	4.18	3.59		
Creek Chub	N	Ģ	N	T	120	180.00	14.29	1.72	18.27	9.54		
Striped Shiner	N	- 1	s		6	9.00	0.71	0.04	0.45	4.67		
Silverjaw Minnow	N	1	М		4	6.00	0.48	0.02	0.21	3.25		
Fathead Minnow	N	O	С	Т	4	6.00	0.48	0.01	0.10	1.50		
Bluntnose Minnow	N	0	С	Т	63	94.50	7.50	0.34	3.58	3.56		
Central Stoneroller	N	Н	N		400	600.00	47.62	3.30	35.12	5.50		
Yellow Bullhead		- 1	С	Ŧ	6	9.00	0.71	0.61	6.51	68.00		
Pumpkinseed Sunfish	s	j	С	Р	1	1.50	0.12	0.05	0.51	32.00		
Johnny Darter	D	ı	С		53	79.50	6.31	0.20	2.08	2.45		
Greenside Darter	D	1	s	М	7	10.50	0.83	0.07	0.70	6.29		
Mottled Sculpin		1	С		2	3.00	0.24	0.06	0.64	20.00		

14

0

Date Total

Number of Species

Number of Hybrids

1,260.00

9.40

River Code: 08-200 River Mile: 28.80	Strear Basin			Fork I	Sample	Sample Date: 08/24/1999				
Data Source: 01				57 sec		n Area: 26.	0 sa mi	Invalid	Sample:	
Purpose:	Dist F						Flow: C	Sampler Type:		)
Species Name / ODNR status			Bree Guild		# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		1	С	T	1	1.50	0.43	0.01	0.01	5.00
Grass Pickerel		Р	М	Р	9	13.50	3.86	0.48	0.74	35.67
Northern Hog Sucker	R	I	S	М	1	1.50	0.43	0.07	0.11	48.00
White Sucker	W	0	s	Т	107	160.50	45.92	21.07	32.31	131.30
Common Carp	G	٥	М	Т	11	16.50	4.72	39.39	60.40	2,387.50
Creek Chub	N	G	N	T	12	18.00	5.15	0.07	0.11	4.00
Striped Shiner	N	1	s		9	13.50	3.86	0.50	0.76	36.89
Bluntnose Minnow	N	0	С	Т	6	9.00	2.58	0.04	0.06	4.00
Central Stoneroller	N	Н	N		1 -	1.50	0.43	0.06	0.09	38.00
Yellow Bullhead		I	С	T	9	13.50	3.86	1.08	1.66	80.00
Brown Bullhead		1	С	Т	2	3.00	0.86	0.17	0.26	55.50
Black Bullhead		1	С	Р	1	1.50	0.43	0.15	0.23	100.00
White Crappie	S	1	С		2	3.00	0.86	0.15	0.23	50.00
Largemouth Bass	F	¢	С		4	6.00	1.72	0.50	0.76	83.00
Green Sunfish	s	1	C	T	27	40.50	11.59	0.63	0.96	15.44
Bluegill Sunfish	S	1	С	Р	6	9.00	2.58	0.46	0.70	50.67
Pumpkinseed Sunfish	S	1	С	P	21	31.50	9.01	0.37	0.56	11.62
Johnny Darter	D	1	С		2	3.00	0.86	0.01	0.01	2.00
Greenside Darter	D	ŀ	s	М	1	1.50	0.43	0.00	0.00	2.00
Mottled Sculpin		1	С		1	1.50	0.43	0.03	0.05	22.00
	Date 1	Total			233	349.50		65.23		
	Numb	er of .	Specie	es	20					
	Numb	er of	Hybric	is	0					

River Code: 08-200 River Mile: 25.80	Basin Time	: Li Fishe	ttle Be	Fork I eaver C 96 sec 14 km	) sq mi	Sample Date: 1999  Date Range: 07/14/1999  Thru: 08/24/1999  Sampler Type: D				
Species Name / ODNR status			Bree Guild		# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Grass Pickerel		P	М	Р	13	8.86	5.33	0.18	0.42	20.08
Northern Hog Sucker	R	1	S	М	14	9.55	5.74	1.29	3.05	135.14
White Sucker	W	0	s	T	101	68.86	41.39	11.17	26.44	162.23
Common Carp	G	0	M	Τ	12	8.18	4.92	27.80	65.80	3,397.92
Creek Chub	N	G	N	T	1	0.68	0.41	0.04	0.09	58.00
Striped Shiner	N	ı	s		7	4.77	2.87	0.16	0.38	33.71
Bluntnose Minnow	N	0	С	Т	25	17.05	10.25	0.07	0.16	3.96
Central Stoneroller	N	Н	N		5	3.41	2.05	0.11	0.26	32.60
Yellow Bullhead		I	С	T	10	6.82	4.10	0.63	1.49	92.50
White Crappie	s	1	С		3	2.05	1.23	0.20	0.48	99.00
Largemouth Bass	F	С	С		12	8.18	4.92	0.09	0.22	11.25
Green Sunfish	s	ı	С	Т	5	3.41	2.05	0.13	0.30	36.60
Bluegill Sunfish	s	ı	С	Р	4	2.73	1.64	0.11	0.26	40.50
Pumpkinseed Sunfish	s	1	С	Р	9	6.14	3.69	0.20	0.46	31.78
Bluegill X Pumpkinseed					1	0.68	0.41	0.01	0.02	14.00
Blackside Darter	D	1	S		1	0.68	0.41	0.00	0.01	6.00
Johnny Darter	D	1	С		11	7.50	4.51	0.01	0.02	1.18
Greenside Darter	D	ŀ	s	M	3	2.05	1.23	0.01	0.03	5.33
Rainbow Darter	D	1	s	М	1	0.68	0.41	0.00	0.00	2.00
Mottled Sculpin		- 1	С		6	4.09	2.46	0.04	0.09	9.50
	Mile 1	otal			244	166.36		42.25		
	Number of Species				19					
	Number of Hybrids				1					

River Code: 08-200						aver Creek		Sample	Date: 0	8/25/1999	
River Mile: 23.50 Data Source: 01 Purpose:	Basin: Time Dist F	Fishe	d: 22	eaver C 70 sec 20 km	Drai	n Area: 36.0 th: 70 cm	) sq mi Flow: C	1	Invalid Sample: Sampler Type: D		
Species Name / ODNR status			Bree Guild		# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight	
Grass Pickerel		P	М	Р	4	6.00	2.03	0.11	0.64	17.50	
Northern Hog Sucker	R	ı	S	M	18	27.00	9.14	2.20	13.47	81.39	
White Sucker	W	0	S	T	35	52.50	17.77	4.67	28.58	88.85	
Common Carp	G	0	М	τ	1	1.50	0.51	5.85	35.84	3,900.00	
Creek Chub	N	G	N	Τ.	35	52.50	17.77	0.29	1.80	5.60	
Striped Shiner	N	ŀ	S		12	18.00	6.09	0.42	2.57	23.33	
Bluntnose Minnow	N	0	С	Т	7	10.50	3.55	0.05	0.29	4.57	
Central Stoneroller	N	Н	N		23	34.50	11.68	0.89	5.42	25.65	
Yellow Bullhead		Ţ	С	Т	1	1.50	0.51	0.29	1.75	190.00	
Largemouth Bass	F	. C	С		3	4.50	1.52	0.58	3.58	129.67	
Green Sunfish	8	í	С	Т	3	4.50	1.52	0.20	1.19	43.33	
Bluegill Sunfish	s	1	С	P	9	13.50	4.57	0.51	3.12	37.78	
Pumpkinseed Sunfish	s	- 1	С	Р	1	1.50	0.51	0.02	0.13	14.00	
Johnny Darter	D	1	С		1	1.50	0.51	0.00	0.01	1.00	
Greenside Darter	D	ŧ	s	M	21	31.50	10.66	0.06	0.39	2.00	
Rainbow Darter	D	ì	. \$	М	7	10.50	3.55	0.05	0.28	4.29	
Fantail Darter	D	ı	C		1	1.50	0.51	0.00	0.02	2.00	

197

18

0

22.50

295.50

С

Date Total

Number of Species

Number of Hybrids

7.61

0.15

16.32

0.92

6.67

Mottled Sculpin

					1 ugc 20						
River Code: 08-200 River Mile: 23.50	Basin	: Li Fishe	ttle B d: 41	Fork I eaver C 37 sec 40 km	reek Drai	aver Creek n Area: 36.0 of Passes: 2	) sq mi	Sample Date: 1999 Date Range: 07/14/1999 Thru: 08/25/1999 Sampler Type: D			
Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight	
Central Mudminnow		1	C	Т	2	1.50	0.57	0.01	0.03	4.50	
Grass Pickerel		Р	М	P	5	3.75	1.43	0.10	0.42	26.00	
Northern Hog Sucker	R	1	S	M	28	21.00	8.00	2.28	9.81	108.43	
White Sucker	W	0	S	T	40	30.00	11.43	2.62	11.29	87.37	
Common Carp	G	0	М	Т	7	5.25	2.00	15.00	64.60	2,857.14	
Creek Chub	N	G	N	Т	39	29.25	11.14	0.24	1.01	8.05	
Striped Shiner	N	ı	S		22	16.50	6.29	0.35	1.50	21.06	
Bluntnose Minnow	N	0	С	Т	14	10.50	4.00	0.05	0.20	4.50	
Central Stoneroller	N	Н	N		91	68.25	26.00	1.07	4.59	15.60	
Yellow Bullhead		1	С	T	2	1.50	0.57	0.35	1.49	230.00	
Black Crappie	s	1	С		1	0.75	0.29	0.04	0.18	55.00	
Largemouth Bass	F	С	С		4	3.00	1.14	0.29	1.27	98.00	
Green Sunfish	s	I	С	Т	3	2.25	0.86	0.10	0.42	43.33	
Bluegill Sunfish	s	1	С	P	17	12.75	4.86	0.49	2.10	38.29	
Pumpkinseed Sunfish	s	I	С	Р	4	3.00	1.14	0.03	0.14	11.00	
Johnny Darter	D	ı	С		2	1.50	0.57	0.00	0.01	1.50	
Greenside Darter	Ď	ı	s	М	38	28.50	10.86	0.08	0.35	2.84	
Rainbow Darter	D	ł	S	М	8	6.00	2.29	0.02	0.10	4.00	

22

350

20

0

0.75

16.50

262.50

0.29

6.29

0.00

0.11

23.22

0.01

0.49

2.00

6.91

Fantail Darter

Mottled Sculpin

D

Mile Total

Number of Species

Number of Hybrids

С

С

River Code: 08-200	1			Fork L	Sample	Sample Date: 08/25/1999					
River Mile: 21.80	Basin			eaver C			0	T1: .1	C1		
Data Source: 01		Time Fished: 1857 sec Dist Fished: 0.20 km				n Area: 41.			Sample:	,	
Purpose:	Distr	Dist Fished: 0.20 km				h: 50 cm	Flow: C	Sample	Sampler Type: D		
Species		Feed			# of	Relative	% by	Relative	% by	Ave(gm)	
Name / ODNR status	Grp	Guild	Guild	Tol	Fish	Number	Number	Weight	Weight	Weight	
Central Mudminnow		. 1	С	T	1	1.50	0.33	0.01	0.02	3.00	
Grass Pickerel		Р	M	P	5	7.50	1.63	0.21	0.76	27.60	
Northern Hog Sucker	R	- 1	s	М	36	54.00	11.73	8.33	30.39	154.25	
White Sucker	W	0	s	T	51	76.50	16.61	10.24	37.35	133.86	
Common Carp	G	0	М	Т	2	3.00	0.65	3.61	13.15	1,202.00	
Creek Chub	N	G	N	T	22	33.00	7.17	0.98	3.58	29.73	
Striped Shiner	N	I	S		6	9.00	1.95	0.49	1.78	54.17	
Silverjaw Minnow	N	ļ	M		1	1.50	0.33	0.00	0.01	2.00	
Bluntnose Minnow	N	0	С	Т	58	87.00	18.89	0.27	0.98	3.10	
Central Stoneroller	N	Н	N		42	63.00	13.68	0.86	3.12	13.57	
Yellow Bullhead		- 1	C	Т	4	6.00	1.30	0.40	1.46	66.50	
Rock Bass	s	С	С		15	22.50	4.89	1.31	4.79	58.36	
Largemouth Bass	F	С	С		2	3.00	0.65	0.37	1.34	122.00	
Green Sunfish	s	1	С	T	1	1.50	0.33	0.02	0.08	15.00	
Johnny Darter	D	I	С		13	19.50	4.23	0.03	0.12	1.69	
Greenside Darter	D	ŧ	s	M	19	28.50	6.19	0.10	0.35	3.37	
Rainbow Darter	D	ı	s	M	5	7.50	1.63	0.02	0.07	2.40	
Fantail Darter	D	1	С		1	1.50	0.33	0.00	0.01	2.00	
Mottled Sculpin		1	С		23	34.50	7.49	0.18	0.66	5.22	
	Date 7	Total			307	460.50		27.41			
	Numb	er of S	Specie	95	19						
	Numb	er of l	Чуbria	ls .	0						

River Code: 08-200	Stream: Middle Fork Li	ttle Beaver Creek	Sample Date:	1999
River Mile: 21.80	Basin: Little Beaver Cre	eek	Date Range:	07/14/1999
,	Time Fished: 3979 sec	Drain Area: 41.0 sq mi	Thru:	08/25/1999
	Dist Fished: 0.40 km	No of Passes: 2	Sampler Type	: D

Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow	_	ı	С	Т	1	0.75	0.21	0.00	0.01	3.00
Grass Pickerel		P	M	Р	6	4.50	1.24	0.11	0.57	24.00
Northern Hog Sucker	R	l	s	М	48	36.00	9.92	5.29	27.97	147.04
White Sucker	W	0	s	Т	71	53.25	14.67	7.38	38.98	138.55
Common Carp	G	0	М	Т	2	1.50	0.41	1.80	9.53	1,202.00
Creek Chub	· N	G	N	T	30	22.50	6.20	0.68	3.57	30.02
Striped Shiner	N	ŀ	s		9,	6.75	1.86	0.31	1.62	45.44
Silverjaw Minnow	N	ı	M		5	3.75	1.03	0.01	0.08	3.80
Bluntnose Minnow	N	0	С	T	85	63.75	17.56	0.21	1.10	3.27
Central Stoneroller	N	Н	Ν		55	41.25	11.36	0.50	2.66	12.20
Yellow Builhead		ŧ	С	T	7	5.25	1.45	0.38	2.02	72.71
Rock Bass	\$	С	С		26	19.50	5.37	1.67	8.82	85.55
Largemouth Bass	F	¢	С		2	1.50	0.41	0.18	0.97	122.00
Green Sunfish	s	i	С	T	1	0.75	0.21	0.01	0.06	15.00
Johnny Darter	D	1	С		16	12.00	3.31	0.02	0.11	1.69
Greenside Darter	D	1	S	М	33	24.75	6.82	0.08	0.43	3.30
Rainbow Darter	D	ı	s	М	25	18.75	5.17	0.03	0.15	1.48
Fantail Darter	D	- 1	С		4	3.00	0.83	0.01	0.03	1.75
Mottled Sculpin		1	С		58	43.50	11.98	0.26	1.35	5.86
	Mile 1	Total			484	363.00		18.93		
		er of s	Specie	es	19					
		er of I	•		0					

River Code: 08-200	Stream	n: M	id d le	Fork L	ittle Be	aver Creel	ζ	Sample Date: 08/25/1999			
River Mile: 20.90	Basin	: Li	ttle B	eaver C	reek			1		ĺ	
Data Source: 01	Time	Fishe	d: 20	31 sec	Drain	n Area: 73.	0 sq mi	Invalid	Sample:		
Purpose:	Dist F	ished	: 0.2	25 km	Dept	Depth: 60 cm Flow: C			Sampler Type: D		
Species			Bree		# of	Relative	% by	Relative	% by	Ave(gm)	
Name / ODNR status	Grp	Guild	Guild	l Tol	Fish	Number	Number	Weight	Weight	Weight	
Grass Pickerel		P	M	P	2	2.40	1.55	0.10	0.60	41.00	
Northern Hog Sucker	R	1	s	М	11	13.20	8.53	0.71	4.35	53.55	
White Sucker	W	0	s	T	10	12.00	7.75	1.94	11.91	161.30	
Common Carp	G	0	M	T	1	1.20	0.78	5.52	33.95	4,600.00	
Striped Shiner	N	I	s		7	8.40	5.43	0.14	0.85	16.57	
Bluntnose Minnow	N	0	С	Ŧ	7	8.40	5.43	0.02	0.11	2.14	
Yellow Bullhead		1	С	T	9	10.80	6.98	1.34	8.25	124.22	
White Crappie	s	ı	С		3	3.60	2.33	0.53	3.27	147.67	
Black Crappie	S	1	C		2	2.40	1.55	0.35	2.17	147.00	
Rock Bass	Ś	С	С		19	22.80	14.73	1.59	9.79	69.84	
Largemouth Bass	F	С	C		16	19.20	12.40	1.76	10.83	91.69	
Green Sunfish	S	ŀ	С	Т	1	1.20	0.78	0.00	0.01	2.00	
Bluegill Sunfish	S	í	С	P	38	45.60	29.46	2.19	13.48	48.04	
Pumpkinseed Sunfish	s	1	С	P	2	2.40	1.55	0.07	0.41	27.50	
Fantail Darter	D	1	С		1	1.20	0.78	0.00	0.01	2.00	
	Date 7	Total			129	154.80		16.26			
	Numb	er of S	Specie	es	15						
	Numb	er of i	Hybria	ls	0						

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 1999
River Mile: 20.90	Basin: Little Beaver Creek	Date Range: 08/25/1999
	Time Fished: 2031 sec Drain Area: 73.0 sq mi	
	Dist Fished: 0.25 km No of Passes: 1	Sampler Type: D

Species Name / ODNR status			Breed Guild		# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Grass Pickerel		P	М	P	2	2.40	1.55	0.10	0.60	41.00
Northern Hog Sucker	R	1	S	М	11	13.20	8.53	0.71	4.35	53.55
White Sucker	W	0	S	Т	10	12.00	7.75	1.94	11.91	161.30
Common Carp	G	0	M	Т	1	1.20	0.78	5.52	33.95	4,600.00
Striped Shiner	N	1	S		7	8.40	5.43	0.14	0.85	16.57
Bluntnose Minnow	N	0	С	Т	7	8.40	5.43	0.02	0.11	2.14
Yellow Bullhead		1	С	T	9	10.80	6.98	1.34	8.25	124.22
White Crappie	s	ŀ	С		3	3.60	2.33	0.53	3.27	147.67
Black Crappie	S	i	С		2	2.40	1.55	0.35	2.17	147.00
Rock Bass	S	С	С		19	22.80	14.73	1.59	9.79	69.84
Largemouth Bass	· <b>F</b>	С	С		16	19.20	12.40	1.76	10.83	91.69
Green Sunfish	S	1	C	Т	1	1.20	0.78	0.00	0.01	2.00
Bluegill Sunfish	s	1	C	Р	38	45.60	29.46	2.19	13.48	48.04
Pumpkinseed Sunfish	s	t	С	Р	2	2.40	1.55	0.07	0.41	27.50
Fantail Darter	D	l	С		1	1.20	0.78	0.00	0.01	2.00
	Mile Total				129	154.80		16.26		
	Numb	er of S	Specie	95	15					
	Numb	er of I	Hybrid	's	0					

River Code: 08-200 River Mile: 15.00	Strear Basin			Fork L eaver C		Sample Date: 07/15/1999					
Data Source: 01	Time	Fishe	d: 22	62 sec	Drai	n Area: 96.0	o sq mi	Invalid	Invalid Sample:		
Purpose:	Dist F	ished	: 0.2	20 km	Depth: 50 cm Flow: C			Sample	Sampler Type: D		
Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight	
Northern Hog Sucker	R	1	S	М	27	40.50	7.52	8.07	61.09	199.20	
White Sucker	W	0	S	Т	29	43.50	8.08	2.56	19.39	58.86	
Blacknose Dace	N	G	S	Ŧ	2	3.00	0.56	0.01	0.07	3.00	
Creek Chub	N	G	N	Т	10	15.00	2.79	0.31	2.33	20.50	
Bluntnose Minnow	N	0	С	T	7	10.50	1.95	0.07	0.50	6.29	
Central Stoneroller	N	Н	N		24	36.00	6.69	0.33	2.48	9.09	
Rock Bass	s	C	С		1	1.50	0.28	0.09	0.68	60.00	
Largemouth Bass	F	¢	С		1	1.50	0.28	0.00	0.02	1.00	
Johnny Darter	D	1	C		8	12.00	2.23	0.02	0.18	2.00	
Greenside Darter	D	ł	s	М	30	45.00	8.36	0.10	0.77	2.27	
Rainbow Darter	D	1	S	М	28	42.00	7.80	0.09	0.67	2.11	
Fantail Darter	D	- 1	С		24	36.00	6.69	0.08	0.63	2.29	
Mottled Sculpin		i	С		168	252.00	46.80	1.48	11.21	5.88	
	Date <sup>*</sup> Numb Numb	er of S	•		359 13 0	538.50		13.21			

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 08/25/1999
River Mile: 15.00	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2690 sec Drain Area: 96.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 45 cm Flow: C	Sampler Type: D

					<u>-</u>		·			
Species	IBI				# of	Relative	% by	Relative	% by	Ave(gm)
Name / ODNR status	Grp	Guild	Guild	IOI	Fish	Number	Number	Weight	Weight	Weight
Grass Pickerel		Р	M	Р	1	1.50	0.17	0.05	0.40	30.00
Northern Hog Sucker	R	1	s	M	32	48.00	5.32	5.23	46.30	108.97
White Sucker	W	0	S	Т	42	63.00	6.99	1.10	9.69	17.38
Blacknose Dace	N	G	s	T	6	9.00	1.00	0.04	0.37	4.67
Creek Chub	N	Ģ	N	Т	28	42.00	4.66	1.26	11.15	30.00
Bluntnose Minnow	N	0	С	Т	31	46.50	5.16	0.17	1.53	3.71
Central Stoneroller	N	Н	N		161	241.50	26.79	1.67	14.76	6.91
Rock Bass	S	С	С		5	7.50	0.83	0.03	0.29	4.40
Largemouth Bass	F	С	С		1	1.50	0.17	0.02	0.13	10.00
Johnny Darter	D	1	С		16	24.00	2.66	0.04	0.34	1.57
Greenside Darter	D	1	s	M	54	81.00	8.99	0.15	1.33	1.85
Rainbow Darter	D	1	S	M	37	55.50	6.16	0.10	0.85	1.72
Fantail Darter	D	1	С		24	36.00	3.99	0.11	0.96	3.00
Mottled Sculpin		I	С		163	244.50	27.12	1.35	11.91	5.50
•	Date	Total			601	901.50		11.30	-	
	Num	ber of	Specie	95	14					
		ber of .	•		0					

River Code: 08-200 River Mile: 15.00	Stream: Middle Fork Little Beaver Creek Basin: Little Beaver Creek Time Fished: 4952 sec Drain Area: 96.0 sq mi Dist Fished: 0.40 km No of Passes: 2							Sample Date: 1999 Date Range: 07/15/1999 Thru: 08/25/1999 Sampler Type: D		
Species Name / ODNR status	IBI		Bree Guild	d	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Grass Pickerel		P	М	Р	1	0.75	0.10	0.02	0.18	30.00
Northern Hog Sucker	R	T	\$	M	59	44.25	6.15	6.65	54.27	150.26
White Sucker	w	0	s	T	71	53.25	7.40	1.83	14.92	34.33
Blacknose Dace	N	G	s	T	8	6.00	0.83	0.03	0.21	4.25
Creek Chub	N	G	N	Т	38	28.50	3.96	0.78	6.40	27.50
Bluntnose Minnow	N	0	С	Т	38	28.50	3.96	0.12	0.98	4.18
Central Stoneroller	N	Н	N		185	138.75	19.27	1.00	8.14	7.19
Rock Bass	s	С	С		6	4.50	0.63	0.06	0.50	13.67
Largemouth Bass	F	С	С		2	1.50	0.21	0.01	0.07	5.50
Johnny Darter	D	- 1	С		24	18.00	2.50	0.03	0.25	1.71
Greenside Darter	D	i	s	М	84	63.00	8.75	0.13	1.03	2.00
Rainbow Darter	D	1	s	М	65	48.75	6.77	0.09	0.75	1.89
Fantail Darter	D	-1	С		48	36.00	5.00	0.10	0.78	2.65
Mottled Sculpin		l	С		331	248.25	34.48	1.41	11.53	5.69
	Mile T	otal			960	720.00		12.25		

Number of Species

Number of Hybrids

River Code: 08-200 River Mile: 4.40	Stream Basin:			Fork I	Sample	Sample Date: 07/15/1999					
Data Source: 01	Time Fished: 2747 sec					n Area: 138	3.0 sa mi	Invalid	Invalid Sample:		
Purpose:	1	Dist Fished: 0.22 km				Depth: 45 cm Flow: C			Sampler Type: D		
Species Name / ODNR status			Bree Guild		# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight	
Gizzard Shad		0	М		3	4.09	2.94	0.67	1.90	164.33	
Silver Redhorse	R	1	S	М	1	1.36	0.98	1.91	5.41	1,400.00	
Black Redhorse	R	1	s	1	3	4.09	2.94	2.18	6.17	532.67	
Golden Redhorse	R	1	s	М	1	1.36	0.98	0.54	1.53	396.00	
Northern Hog Sucker	R	1	s	М	10	13.64	9.80	2.30	6.50	168.30	
White Sucker	W	0	S	T	3	4.09	2.94	1.34	3.79	327.33	
Common Carp	G	0	М	T	8	10.91	7.84	15.65	44.32	1,434.38	
Silver Shiner	N	ŀ	S	Į.	2	2.73	1.96	0.02	0.05	6.00	
Striped Shiner	N	- 1	S		1	1.36	0.98	0.01	0.01	4.00	
Spotfin Shiner	N	1	М		7	9.55	6.86	0.06	0.16	5.71	
Bluntnose Minnow	N	0	С	T	7	9.55	6.86	0.03	0.08	2.86	
Rock Bass	8	Ç	C		1	1.36	0.98	0.12	0.35	91.00	
Smallmouth Bass	F	С	С	М	9	12.27	8.82	4.04	11.43	329.00	
Green Sunfish	8	1	C	Т	1	1.36	0.98	0.00	0.01	3.00	
Bluegill Sunfish	s	1	С	P	2	2.73	1.96	0.03	0.08	10.50	
Logperch	D	- 1	S	M	4	5.46	3.92	0.12	0.33	21.00	
Greenside Darter	D	l	s	M	21	28.64	20.59	0.10	0.29	3.57	
Banded Darter	D	1	S	i	6	8.18	5.88	0.03	80.0	3.33	
Rainbow Darter	D	- 1	·s	М	3	4.09	2.94	0.01	0.03	2.67	
Freshwater Drum			М	Р	8	10.91	7.84	6.15	17.42	563.63	
Mottled Sculpin		1	С		1	1.36	0.98	0.02	0.07	17.00	
	Date T	otal			102	139.09		35.31			
	Numbe	er of :	Specie	25	21						

Number of Hybrids

River Code: 08-200	Stream: Middle Fork Li	ittle Beaver Creek	Sample Date: 08/26/1999
River Mile: 4.40	Basin: Little Beaver Cr	eek	į
Data Source: 01	Time Fished: 2161 sec	Drain Area: 138.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.22 km	Depth: 70 cm Flow: C	Sampler Type: D

Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
	Gib.			101		1.36	0.27	0.01	0.02	7.00
Skipjack Herring		P	М		1 18	24.55	4.88	1.97	4.82	80.24
Gizzard Shad		0	M				4.00 1.08	3.72	4.62 9.12	682.75
Black Redhorse	R	1	s	1	4 11	5.46 15.00	2.98	3.72	9.38	255.27
Golden Redhorse	R	1	S	M						
Northern Hog Sucker	R	1	S	M	15	20.46	4.07	4.54	11.11	221.87
White Sucker	W	0	S	T	7	9.55	1.90	1.41	3.44	147.14
Common Carp	G	0	М	Т	8	10.91	2.17	14.69	35.97	1,346.38
Silver Shiner	N	1	S	1	102	139.09	27.64	0.41	0.99	2.91
Rosyface Shiner	N	ı	S	ı	18	24.55	4.88	0.05	0.13	2.11
Striped Shiner	N	I	S		4	5.46	1.08	0.11	0.26	19.25
Spotfin Shiner	N	1	М		42	57.27	11.38	0.20	0.50	3.54
Sand Shiner	N	1	М	M	38	51.82	10.30	0.11	0.27	2.11
Mimic Shiner	N	l	М	1	2	2.73	0.54	0.01	0.02	2.50
Silverjaw Minnow	N	ı	M		2	2.73	0.54	0.01	0.02	3.00
Bluntnose Minnow	N	0	С	T	16	21.82	4.34	0.06	0.15	2.88
Yellow Bullhead		i	С	T	1	1.36	0.27	0.01	0.01	4.00
Stonecat Madtom		1	С	1	2	2.73	0.54	0.19	0.46	68.50
Rock Bass	s	С	С		4	5.46	1.08	0.50	1.23	92.50
Smallmouth Bass	F	С	С	М	9	12.27	2.44	2.33	5.70	189.56
Green Sunfish	s	1	С	Т	1	1.36	0.27	0.05	0.13	38.00
Bluegill Sunfish	s	1	С	Р	6	8.18	1.63	0.22	0.54	26.83
Sauger	F	Р	S		1	1.36	0.27	0.78	1.91	572.00
Logperch	D	1	s	М	1	1.36	0.27	0.02	0.05	16.00
Greenside Darter	D	- 1	s	М	22	30.00	5.96	0.07	0.18	2.41
Banded Darter	D	ı	s	1	21	28.64	5.69	0.06	0.14	2.00
Rainbow Darter	D	1	s	М	4	5.46	1.08	0.01	0.03	2.00
Freshwater Drum			М	Þ	9	12.27	2.44	5.49	13.43	446.89
	Date :	Total			369	503.18		40.84		
	Numb		Snaci	ac	27	000.10		-10.07		
	Numb		•		0					
	เขนเทบ	CI UII	nyonk	13	5					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 1999
River Mile: 4.40	Basin: Little Beaver Creek	Date Range: 07/15/1999
	Time Fished: 4908 sec Drain Area: 138.0 sq mi	Thru: 08/26/1999
	Dist Fished: 0.44 km No of Passes: 2	Sampler Type: D

Species Name / ODNR status			Bree Guild		# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Skipjack Herring	<u> </u>	P	M	. 10,	1	0.68	0.21	0.01	0.01	7.00
Gizzard Shad		0	M		21	14.32	4.46	1.32	3.47	92.25
Silver Redhorse	R	1	S	М	1	0.68	0.21	0.95	2.51	1,400.00
Black Redhorse	R	1	S	191	7	4.77	1.49	2.95	7.75	618.43
Golden Redhorse	R	1	S	M	, 12	8.18	2.55	2.18	5.74	267.00
Northern Hog Sucker	R	1	S	M	25	17.05	5.31	3.42	8.97	200.44
White Sucker	W	0	S	T T	10	6.82	2.12	1.37	3.60	201.20
Common Carp	W G	0	M	T	16	10.91	3.40	15.17	39:84	1,390.38
Silver Shiner	N	ı	S	i	104	70.91	22.08	0.21	0.55	2.97
		) I	S	ı İ	18	12.27	3.82	0.21	0.07	2.97
Rosyface Shiner	N	•	\$ \$	1	5	3.41	3.62 1.06	0.03	0.07	16.20
Striped Shiner	N	1	S M		. 49	33.41	10.40	0.08	0.14	3.85
Spotfin Shiner	N	1			49 38	25.91	8.07	0.13	0.34	2.11
Sand Shiner	N	1	М	M		25.91 1.36	0.07 0.42	0.05	0.14	
Mimic Shiner	N		M	1	2 2	1.36	0.42	0.00	0.01	2.50 3.00
Silverjaw Minnow	N	l	М							
Bluntnose Minnow	N	0	С	T -	23	15.68	4.88	0.05	0.12	2.87
Yellow Bullhead		1	C	T	1	0.68	0.21	0.00	0.01	4.00
Stonecat Madtom	_	- 1	С	i	2	1.36	0.42	0.09	0.25	68.50
Rock Bass	S	С	С		5	3.41	1.06	0.31	0.82	92.20
Smallmouth Bass	F	С	С	М	18	12.27	3.82	3.18	8.36	259.28
Green Sunfish	S	1	С	Т	2	1.36	0.42	0.03	0.07	20.50
Bluegill Sunfish	S	I	С	Ρ	8	5.45	1.70	0.12	0.33	22.75
Sauger	F	Ρ	S		1	0.68	0.21	0.39	1.02	572.00
Logperch	D	i	S	М	5	3.41	1.06	0.07	0.18	20.00
Greenside Darter	D	i	S	M	43	29.32	9.13	0.09	0.23	2.98
Banded Darter	D	ı	S	ŀ	27	18.41	5.73	0.04	0.11	2.30
Rainbow Darter	D	I	S	М	7	4.77	1.49	0.01	0.03	2.29
Freshwater Drum			М	P	17	11.59	3.61	5.82	15.28	501.82
Mottled Sculpin		1	С		1	0.68	0.21	0.01	0.03	17.00
	Mile 1	otal			471	321.14		38.07		
	Numb	er of	Speci	es	29					
	Numb	er of	Hybrid	is	0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 07/15/1999
River Mile: 1.90	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2127 sec Drain Area: 141.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 70 cm Flow: C	Sampler Type: D
	· · · · · · · · · · · · · · · · · · ·	

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Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Gizzard Shad		0	М		12	18.00	6.52	3.31	7.22	183.75
Silver Redhorse	R	1	s	М	1	1.50	0.54	1.29	2.81	858.00
Black Redhorse	R	1	s	1	16	24.00	8.70	11.83	25.84	492.87
Golden Redhorse	R	ı	\$	М	3	4.50	1.63	2.03	4.43	450.33
Northern Hog Sucker	R	1	s	М	18	27.00	9.78	8.55	18.67	316.53
White Sucker	W	0	S	T	1	1.50	0.54	0.00	0.00	1.00
Common Carp	G	0	М	T	4	6.00	2.17	13.24	28.91	2,206.25
River Chub	N	1	N	ţ	1	1.50	0.54	0.10	0.21	63.00
Silver Shiner	N	I	S	l	5	7.50	2.72	0.01	0.02	1.40
Rosyface Shiner	N	I	S	i	1	1.50	0:54	0.01	0.01	4.00
Striped Shiner	N	I	S		1	1.50	0.54	0.01	0.02	6.00
Spotfin Shiner	Ν	i	М		2	3.00	1.09	0.04	0.08	12.00
Sand Shiner	N	1	М	М	9	13.50	4.89	0.03	0.07	2.22
Bluntnose Minnow	N	0	С	Т	8	12.00	4.35	0.04	0.08	3.13
Central Stoneroller	N	H	N		4	6.00	2.17	0.05	0.10	7.50
Channel Catfish	F		С		1	1.50	0.54	1.36	2.98	909.00
Yellow Bullhead		1	С	Т	2	3.00	1.09	0.59	1.28	195.00
Stonecat Madtom		I	С	1	1	1.50	0.54	0.08	0.16	50.00
Rock Bass	s	С	C		1	1.50	0.54	0.08	0.17	51.00
Smallmouth Bass	F	С	С	М	1	1.50	0.54	0.50	1.09	331.00
Green Sunfish	s	1	С	T	2	3.00	1.09	0.02	0.05	8.00
Bluegill Sunfish	s	1	С	P	3	4.50	1.63	0.15	0.32	32.67
Sauger	F	Р	S		· 1	1.50	0.54	0.50	1.10	335.00
Greenside Darter	D	1	s	М	31	46.50	16.85	0.18	0.39	3.87
Banded Darter	D	1	s	ı	38	57.00	20.65	0.14	0.30	2.39
Rainbow Darter	D	- 1	S	М	11	16.50	5.98	0.04	0.09	2.55
Freshwater Drum			М	Р	2	3.00	1.09	1.59	3.47	529.00
Mottled Sculpin		1	С		4	6.00	2.17	0.07	0.15	11.25
	Date	Total			184	276.00		45.79		
		ber of	Specie	25	28	_ · - · - · - ·				
		ber of	,		0					
		-	, -							

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 08/26/1999
River Mile: 1.90	Basin: Little Beaver Creek	
Data Source: 01	Time Fished: 2765 sec Drain Area: 141.0 sq mi	Invalid Sample:
Purpose:	Dist Fished: 0.20 km Depth: 80 cm Flow: C	Sampler Type: D

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Species Name / ODNR status			Bree Guild		# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Gizzard Shad		0	М		4	6.00	1.50	0.97	2.01	162.25
Silver Redhorse	R	ı	S	M	7	10.50	2.63	10.61	21.87	1,010.29
Black Redhorse	R	1	s	1	6	9.00	2.26	4.45	9.17	494.00
Golden Redhorse	R	1	s	М	3	4.50	1,13	2.95	6.09	656.00
Shorthead Redhorse	R	- 1	s	M	1	1.50	0.38	0.45	0.93	300.00
Northern Hog Sucker	R	ŀ	S	M	7	10.50	2.63	2.54	5.24	242.29
White Sucker	W	0	S	Т	4	6.00	1.50	1.10	2.26	182.50
Common Carp	G	0	М	T	10	15.00	3.76	16.55	34.13	1,103.60
Emerald Shiner	N	1	s		13	19.50	4.89	0.04	0.07	1.85
Silver Shiner	N	1	S	1	46	69.00	17.29	0.14	0.30	2.09
Rosyface Shiner	N	- 1	s	1	1	1.50	0.38	0.01	0.01	3.00
Striped Shiner	N	L.	S		3	4.50	1.13	0.07	0.13	14.33
Spotfin Shiner	N	1.	M		14	21.00	5.26	0.09	0.18	4.14
Bluntnose Minnow	N	0	С	T	7	10.50	2.63	0.01	0.02	1.14
Central Stoneroller	N	Н	N		1	1.50	0.38	0.01	0.02	7.00
Channel Catfish	F		С		1	1.50	0.38	1.39	2.86	924.00
Yellow Bullhead		i	С	Т	3	4.50	1.13	0.65	1.34	144.67
Stonecat Madtom		ı	С	1	3	4.50	1.13	0.02	0.03	3.33
Rock Bass	S	С	¢		3	4.50	1.13	0.25	0.51	54.33
Smallmouth Bass	F	С	С	М	7	10.50	2.63	2.42	4.99	230.24
Largemouth Bass	F	С	С		3	4.50	1.13	0.08	0.16	17.67
Green Sunfish	S	1	С	T	3	4.50	1.13	0.05	0.10	11.00
Bluegill Sunfish	s	1	С	Р	7	10.50	2.63	0.25	0.51	23.71
Sauger	F	Р	s		1	1.50	0.38	0.39	0.81	261.00
Greenside Darter	D	- 1	S	М	46	69.00	17.29	0.17	0.35	2.43
Banded Darter	D	1	s	i	43	64.50	16.17	0.11	0.22	1.67
Rainbow Darter	D	1	Ş	М	8	12.00	3.01	0.04	0.09	3.50
Freshwater Drum			M	P	3	4.50	1.13	2.62	5.40	582.00
Mottled Sculpin		1	С		8	12.00	3.01	0.10	0.21	8.50
	Date :	Total			266	399.00		48.50		
	Numb		Specie	2.5	29	<b>Q</b> 50.50		10.00		
	Numb		•		0					
	Numb	er of i	Hybrid	is	0					

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	Sample Date: 1999
River Mile: 1.90	Basin: Little Beaver Creek	Date Range: 07/15/1999
	Time Fished: 4892 sec Drain Area: 141.0 sq mi	Thru: 08/26/1999
	Dist Fished: 0.40 km No of Passes: 2	Sampler Type: D

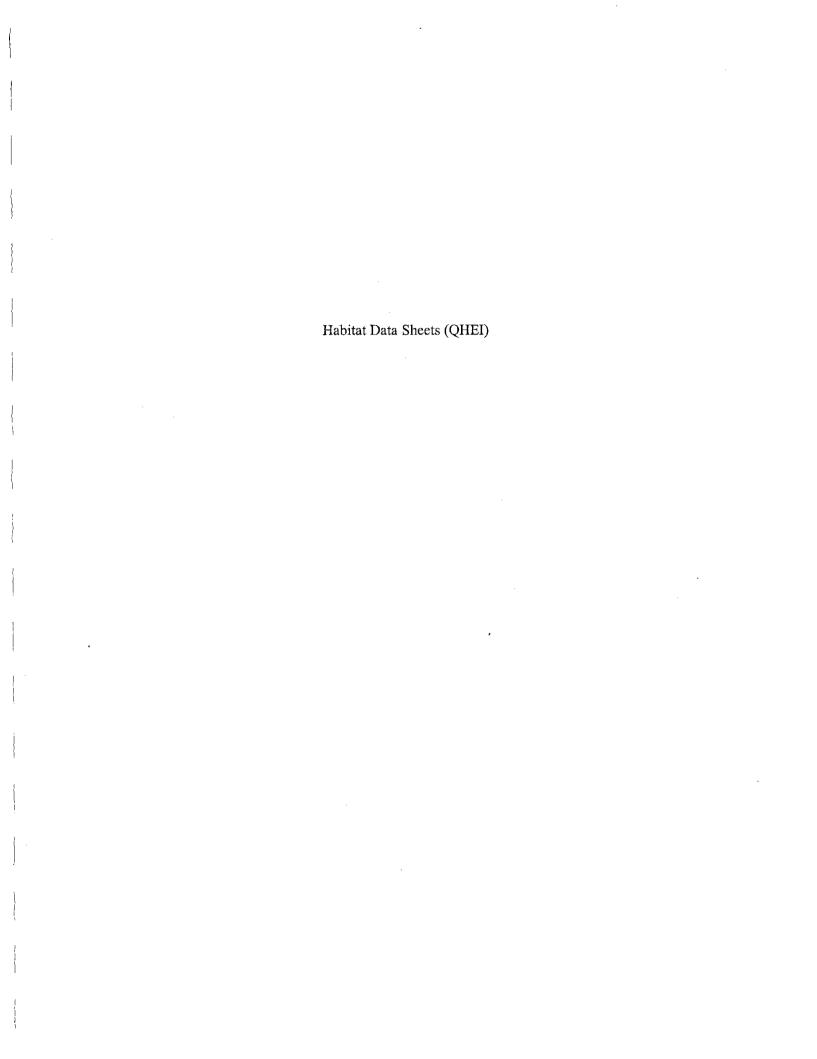
Species Name / ODNR status	IBI Feed Breed Grp Guild Guild Tol		# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight		
Gizzard Shad	O.P	0	М		16	12.00	3.56	2.14	4.54	178.38
Silver Redhorse	R	1	s	M	8	6.00	1.78	5.95	12.62	991.25
Black Redhorse	R	1	s	1	22	16.50	4.89	8.14	17.26	493.18
Golden Redhorse	R	i	S	М	6	4.50	1.33	2.49	5.28	553.17
Shorthead Redhorse	R	1	s	М	1	0.75	0.22	0.23	0.48	300.00
Northern Hog Sucker	R	1	s	М	25	18.75	5.56	5.55	11.76	295.74
White Sucker	W	0	s	Т	5	3.75	1.11	0.55	1.16	146.20
Common Carp	G	0	М	Т	14	10.50	3.11	14.90	31.60	1,418.64
River Chub	N	1	N	1	1	0.75	0.22	0.05	0.10	63.00
Emerald Shiner	N	1	S		13	9.75	2.89	0.02	0.04	1.85
Silver Shiner	N	ı	S	ı	51	38.25	11.33	0.08	0.16	2.02
Rosyface Shiner	N	1	S	1	2	1.50	0.44	0.01	0.01	3.50
Striped Shiner	N	1	s		4	3.00	0.89	0.04	0.08	12.25
Spotfin Shiner	Ν	1	М		16	12.00	3.56	0.06	0.13	5.13
Sand Shiner	N	ı	М	М	9	6.75	2.00	0.02	0.03	2.22
Bluntnose Minnow	Ņ	0	С	Т	15	11.25	3.33	0.03	0.05	2.20
Central Stoneroller	N	Н	N		5	3.75	1.11	0.03	0.06	7.40
Channel Catfish	F		С		2	1.50	0.44	1.38	2.92	916.50
Yellow Bullhead		1	С	T	5	3.75	1.11	0.62	1.31	164.80
Stonecat Madtom		ı	С	- 1	4	3.00	0.89	0.05	0.10	15.00
Rock Bass	S	¢	C		4	3.00	0.89	0.16	0.34	53.50
Smallmouth Bass	F	C.	С	M	8	6.00	1.78	1.46	3.09	242.83
Largemouth Bass	F	С	С		3	2.25	0.67	0.04	0.08	17.67
Green Sunfish	S	1	С	Τ	5	3.75	1.11	0.04	0.08	9.80
Bluegill Sunfish	S	I	С	P	10	7.50	2.22	0.20	0.42	26.40
Sauger	F	Р	S		2	1.50	0.44	0.45	0.95	298.00
Greenside Darter	D	1	s	M	77	57.75	17.11	0,17	0.37	3.01
Banded Darter	D	Į	S	1	81	60.75	18.00	0.12	0.26	2.01
Rainbow Darter	D	- 1	S	M	19	14.25	4.22	0.04	0.09	2.95
Freshwater Drum			M	P	5	3.75	1.11	2.10	4.46	560.80
Mottled Sculpin		1	С		12	9.00	2.67	0.09	0.18	9.42
	Mile T	otal			450	337.50		47.15		
Number of Species			95	31						
Number of Hybrids										

River Code: 08-200	Stream: Middle Fork Little Beaver Creek	River Segment Totals
Mile Range: 1.90	Basin: Little Beaver Creek	Date Range: 07/12/1999
Thru: 40.30	Time Fished: 66277 sec	Thru: 08/26/1999
	Dist Fished: 5.15 km No of Passes: 26	Sampler Type: D E

Species Name / ODNR status			Breed Guild		# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Skipjack Herring		Р	М		1	0.05	0.01	0.00	0.00	7.00
Gizzard Shad		0	М		37	2.02	0.28	0.43	1.50	129.49
Central Mudminnow		1	С	т	7	0.45	0.06	0.00	0.01	4.25
Grass Pickerel		Ρ	М	Р	36	1.99	0.28	0.09	0.30	26.89
Silver Redhorse	R	1	s	М	9	0.51	0.07	0.86	2.98	1,036.67
Black Redhorse	R	1	S	1	29	1.64	0.23	1.39	4.79	523.41
Golden Redhorse	R	1	s	М	18	0.98	0.14	0.58	2.02	362.39
Shorthead Redhorse	R	1	S	М	1	0.06	0.01	0.03	0.10	300.00
Northern Hog Sucker	R	1	s	М	227	12.76	1.80	3.16	10.92	154.34
White Sucker	W	0	s	Т	1,758	108.67	15.29	4.80	16.58	98.24
Common Carp	G	0	М	т	67	3.71	0.52	12.14	41.98	2,161.09
Golden Shiner	N	1	М	Т	7	0.50	0.07			•
River Chub	N	1	N	1	1	0.06	0.01	0.01	0.02	63.00
Blacknose Dace	N	Ģ	s	Т	1,043	72.82	10.25	0.06	0.19	4.06
Creek Chub	N	G	N	Т	1,773	116.45	16.39	0.42	1.45	14.91
Emerald Shiner	N	ı	s		13	0.75	0.11	0.00	0.01	1.85
Silver Shiner	N	i	s	1	155	8.40	1.18	0.04	0.12	2.66
Rosyface Shiner	N	ı	s	ı	20	1.06	0.15	0.00	0.01	2.25
Striped Shiner	N	1	s		89	4.99	0.70	0.16	0.57	23.96
Spotfin Shiner	N	1	М		65	3.49	0.49	0.02	0.08	4.16
Sand Shiner	N	1	М	М	47	2.51	0.35	0.01	0.03	2.13
Mimic Shiner	N	.1	М	1	2	0.10	0.01	0.00	0.00	2.50
Silverjaw Minnow	N	1	М		17	0.97	0.14	0.00	0.01	3.50
Fathead Minnow	N	0	С	Т	138	9.00	1.27	0.00	0.00	1.50
Bluntnose Minnow	N	0	С	Т	1,064	72.03	10.14	0.11	0.37	3.61
Central Stoneroller	N	Н	N		2,704	165.62	23.30	0.75	2.60	7.12
Channel Catfish	F		C.		2	0.12	0.02	0.17	0.59	916.50
Yellow Bullhead		ı	С	Т	65	3.66	0.52	0.45	1.56	100.41
Brown Bullhead		ı	Ç	Т	2	0.12	0.02	0.01	0.04	55.50
Black Bullhead		ı	С	P	1	0.06	0.01	0.01	0.03	100.00
Stonecat Madtom		ı	С	i	6	0.34	0.05	0.02	0.06	32.83
White Crappie	s	1	С		8	0.41	0.06	0.07	0.23	105.00
Black Crappie	s	1	С		3	0.15	0.02	0.03	0.09	116.33
Rock Bass	s	С	С		60	3.22	0.45	0.38	1.30	71.81
Smallmouth Bass	F	С	С	М	26	1.41	0.20	0.58	2.01	254.22
Largemouth Bass	F	С	С		44	2.29	0.32	0.22	0.76	61.26
Green Sunfish	S	ı	С	Т	64	3.75	0.53	0.08	0.26	19.02
Bluegill Sunfish	s	ı	С	Р	115	6.21	0.87	0.28	0.97	40.82
Pumpkinseed Sunfish	s	1	С	Р	56	3.30	0.46	0.06	0.21	17.76
Bluegill X Pumpkinseed					1	0.05	0.01	0.00	0.00	14.00
Green Sf X Pumpkinseed					1	0.06	0.01			
Sauger	F	Р	s		3	0.17	0.02	0.10	0.36	389.33
Blackside Darter	D	1	s		1	0.05	0.01	0.00	0.00	6.00
Logperch	D	1	s	М	5	0.26	0.04	0.01	0.03	20.00
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River: 08-200 Middle Fork Little Beaver Creek

Species Name / ODNR status		Feed Guild			# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Johnny Darter	D	1	С		346	20.72	2.92	0.02	0.08	2.00
Greenside Darter	D	1	s	М	306	17.41	2.45	0.08	0.27	2.88
Banded Darter	D	1	s	ŀ	108	6.09	0.86	0.02	0.07	2.08
Rainbow Darter	D	- 1	s	М	128	7.34	1.03	0.02	0.09	2.13
Fantail Darter	Đ	- 1	С		65	3.75	0.53	0.01	0.04	2.56
Freshwater Drum			M	Р	22	1.18	0.17	0.99	3.42	515.23
Mottled Sculpin		1	С		550	31.69	4.46	0.25	0.88	6.15
Brook Stickleback		1	С		69	5.30	0.75			
	Stream Total Number of Species		11,385	710.70		28.92				
			50							
	Numb	er of I	Tybria	İS	2					



		·	WW.	A ttributoo	Ļ			ΜV	VH Attributes		
			tes   				ı Influer	ıce	Moderate Influence		
	ey HEI ompone	Gradient (ft/mile)	No Crannelization or Recovered Bruide (CobblerGravel Substrates Sitt Free Substrates Good/Excellent Substrates Moderate/High Sinuosity Extensive/Moderate Cover	Fast CurrentEddles Low-Normal Overall Emtedtetnets Max Debih > 4 0 cm Low-Normal Riffle Embeddet he 3=	Total WIWH Attributes	Channelized or No Recover	No Sirvosily EpsiselNo Cover Nax Depth < 40 cm MD, PM)	Total H.J. MWH Attributes	Recovering Channel LeavyModerate Stit Cover Send Substitutes Ects) Faroban Substitute Origin FainFoor Development Low Sinuceity Chiy 1-2 Cover Types Intermittent and Foor Poorls No Fast Curient High Mod. Chaill Embeddedness No Fittle	Total M.I. MMH Attributes	(MWH H.I+1).(WWH+1) Ratio (MWH M.I+1).(MWH+1) Ratio
(08-200)	Middle 1	Fork Little B	Beaver Creek								
Year:											
40.3	<b>155</b> 75	30.30			5			2		6	0.501.50
38.2	46.0	10.75			3	1		3		6	1.002.50
37.7	67.5	11.76			6			2		6	0.431.29
36.7	60.5	13.89			4			2		6	0.601.80
33.3	84.0	18.18			8			0		3	0.11 0.44
32.0	<b>64</b> 70	6.25			7			1		4	0.25 0.75
28.8	50:0	3.74			2			2		8	1.00 3.67
25.8	49.0	4.93	Post When the same		1			2		7	1.505.00
23.5	59.5	5.21			4			2		6	0.601.80
21.8	67.5	3.76			6			0		5	0.14 0.86
20.9	48.0	3.76			1	9.		2		6	1.50 4.50
15.0	83.5	7.84	I SEE SEE SEE		8			0		3	0.110.44
10.9	67.70	8.16			5			1		6	0.331.33
9.9	75.0	8.16			7			0		5	0.130.75
9.0	71.0	8.16			4			0		6	0.171.17
8.4	71.0	5.78		1	5			0		7	0.171.33
4.4	76.5	11.76			6			0		5	0.14 0.86
1.9	77.5	10.50			8			0	The state of the s	4	0.11 0.56

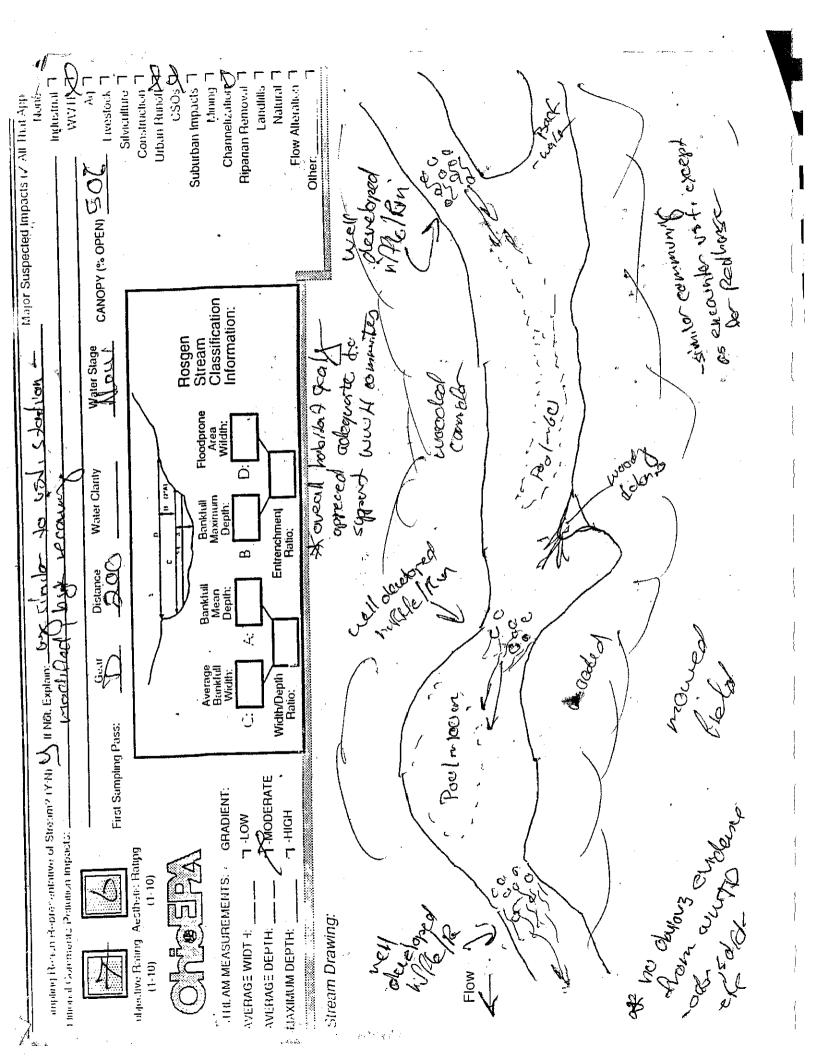
Qualitative Habitat Evaluation Index Field Sheet QHEI Score:
River Code: 08200 RM: 1.9 Stream M. F. L. BONCR CR.
Date 07/599 Location BERL HOLLOW KD
Scorers Initials: DIA Comments RETELENCE SITE LATILONG: 40 44 08/8038:
1] SUBSTRATE (Check ONLYTwo Substrate TYPE BOXES; Estimate % present);
TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE ORIGIN SUBSTRATE QUALITY  Charle ONE (OR 3 S. AVERACE) ONE (OR 3 S. AVERACE)
Check ONE (OR 2 & AVERAGE) Check ONE (OR 2 & AVERAGE)  O D-BOULDER [9]
D-BOULDER [9] D-SAND [6] D-LIMESTONE [1] SILT: D-SILT HEAVY [-2]  D-SOURCE [8] D-BEDROCK[5] N-TILLS [1] Substrate
DO-HARDPAN [4] O D-DETRITUS[3] O -WETLANDS[0] O -SILT NORMAL [0]
O O-MUCK [2] O D-ARTIFICIAL[0] O -HARDPAN [0] O -SILT FREE [1]
O O-SILT [2] -SANDSTONE [0] EMBEDDED O -EXTENSIVE [-2] Max 20
NOTE: (Ignore sludge originating from point-sources;
score on natural substrates)
NUMBER OF SUBSTRATE TYPES: 0-4 or Less [0] 0-SHALE [-1] 0-NONE [1]  COMMENTS 0-COAL FINES [-2] SILT COVERING EVERYTHING
CONVINCINI
2) INSTREAM COVER (see back for instructions for additional cover scoring method)  AMOUNT: (Check ONLY One or Cover type: (Check All That Apply)
UNDERCUT BANKS [1] A Z-POOLS> 70 cm [2] O_OXBOWS, BACKWATERS [1] O - EXTENSIVE > 75% [11]
OVERHANGING VEGETATION [1] O ROOTWADS [1] A LAQUATIC MACROPHYTES [1] - MODERATE 25-75% [7]
7 SHALLOWS (IN SLOW WATER) [1] # 2 BOULDERS [1] D LOGS OR WOODY DEBRIS [1] - SPARSE 5-25% [3] Max 20
COMMENTS: COMMEN
3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)
SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER Channel
O-HIGH [4] O-EXCELLENT [7] NONE [6] DI-HIGH [3] O-SNAGGING. O-MPOUND.
MODERATE [3] DC-GOOD [5] (1) - RECOVERED [4] DC-RECOVERION (1) - ISLANDS (1) - FAIR [3] (1) - FAIR [3] (1) - RECOVERING [3] (1) - LOW [1] (1) - CANOPY REMOVAL (1) - LEVEED (1
2017[2]
TO NONE [1] O - POOR [1] O - RECENT OR NO O - DREDGING O - BANK SHAPING  RECOVERY [1] O - ONE SIDE CHANNEL MODIFICATIONS
COMMENTS:
4], RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) * River Right Looking Downstream?
RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM BANK EROSION Riparian
L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank)
O DWIDE > 50m [4] X[ Ø-FOREST, SWAMP [3] DCONSERVATION TILLAGE [1] Ø-CONONE/LITTLE [3] O DMODERATE [0-50m [3] O DSHRUB OR OLD FIELD [2] D DWIDEMODERATE [2]
「 MODERATE 10-50m [3] ロー-SHRUB OR OLD FIELD [2] ロロー・URBAN OR INDUSTRIAL [0] ロロー・MODERATE [2] 「 MARROW 5-10 m [2] ・ 文文・RESIDENTIAL, PARK, NEW FIELD [1] ロロー・OPEN PASTURE, ROWCROP [0] ロロー・HEAVY/SEVERE[1] Max 10
OC: VERY NARROW <5 m[1] O O -FENCED PASTURE [1] O O -MINING/CONSTRUCTION [0]
□□ NONE [0]
COW-
MENTS:
5.]POOL/GLIDE AND RIFFLE/RUN QUALITY Pool/
MAX. DEPTH MORPHOLOGY CURRENT VELOCITY [POOLS & RIFFLES!] Current
(Check 1 ONLY!) (Check 1 or 2 & AVERAGE) (Check All That Apply)
四- >1m [6] 区 -POOL WIDTH > RIFFLE WIDTH [2] 口 -EDDIES[1] 口 -TORRENTIAL[-1]
□ - 2.7-1m [6] □ -POOL WIDTH > RIFFLE WIDTH [2] □ -EDDIES[1] □ -TORRENTIAL[-1] □ -0.7-1m [4] □ -POOL WIDTH = RIFFLE WIDTH [1] □ -FAST[1] □ -INTERSTITIAL[-1]  Max 12
Ø - >1m [6]       Ø - POOL WIDTH > RIFFLE WIDTH [2]       D' - EDDIES[1]       D' - TORRENTIAL[-1]         D - 0.7-1m [4]       D - POOL WIDTH = RIFFLE WIDTH [1]       Ø - FAST[1]       D' - INTERSTITIAL[-1]         D - 0.4-0.7m [2]       D' - POOL WIDTH < RIFFLE W. [0]
Ø - >1m [6]       Ø - POOL WIDTH > RIFFLE WIDTH [2]       D' - EDDIES[1]       D' - TORRENTIAL[-1]         D - 0.7-1m [4]       D - POOL WIDTH = RIFFLE WIDTH [1]       Ø - FAST[1]       D' - INTERSTITIAL[-1]         D - 0.4-0.7m [2]       D' - POOL WIDTH < RIFFLE W. [0]
Da - >1m [6]   Da - POOL WIDTH   > RIFFLE WIDTH [2]   Da - POOL WIDTH   > RIFFLE WIDTH [1]   Da - POOL WIDTH   = RIFFLE WIDTH [1]   Da - POOL WIDTH   = RIFFLE WIDTH [1]   Da - POOL WIDTH   = RIFFLE WIDTH [1]   Da - POOL WIDTH   = RIFFLE WIDTH [1]   Da - POOL WIDTH   = RIFFLE WIDTH   The riffle width   The riffle w
St > 1m [6]   St POOL WIDTH > RIFFLE WIDTH [2]   D' - EDDIES[1]   D' - TORRENTIAL[-1]   D' - TORRENTIA
St POOL WIDTH > RIFFLE WIDTH [2]   D' - EDDIES[1]   D' - TORRENTIAL[-1]   D - 0.7-1m [4]   D - POOL WIDTH = RIFFLE WIDTH [1]   D' - FAST[1]   D' - INTERWITTENT[-2]   Max 12
State   Stat
State   Stat
S - > 1m [6]
S - > 1m [6]
Sign   Sign
Sign   Sign
S - > 1m [6]
S - > 1m [6]

Is Sampling Reach Representative of the Stream (Y/N)_Y If Not, Explain:	Major Suspected Sources of Impacts (Check All That Apply):
EXTENSIVE SILT bes IN NON-CURRENT POOL MREAT-	None [] Industrial [] WWTP []
SOME 6 DEEP	Ag ☐ Livestock ☐
	Silviculture [] Construction [] Urban Runoff []
Gear: Distance: Water Clarity: Water Stage: Canopy -% Open	CSOs [] Suburban Impacts [] Mining []
First Sampling Pass D 0.20 >/00 cow 20	Channelization () Riparian Removal ()
Stream Measurements:  Subjective Aesthetic Average Average Maximum Av. Bankfull Bankfull Mean W/D Bankfull Max Floodprone Entrench Rating Rating Width Depth Width Depth Ratio	UNT. TAND Landfills () Natural () Dams ()
Rating (1-10)  (1-10)  Gradient:  Gradient:  70 - Low, $\Box$ - Moderate, $\Box$ - High	Other Flow Alteration  Other:
4	
Stream Drawing:	<b>-</b> ∧
37.6	33
Significant of the state of the	
000	
1-2	
	•
Yes The Control of th	stz Is Stream Ephemeral (No pools.
Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where:	totally dry or only damp spots)?  Is There Water Upstream? How Far:
0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter	Is There Water Close Downstream?
logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.	Is Dry Channel Mostly Natural?

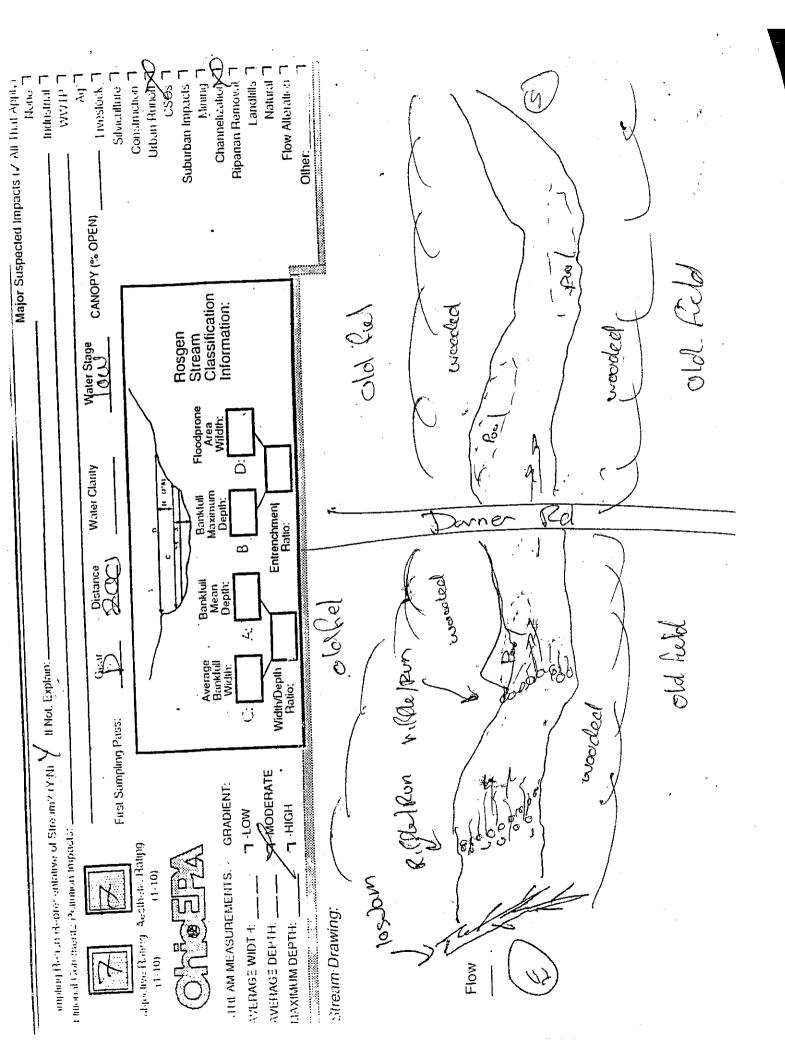
Qualitative Habitat Evaluation Index Field Sheet QHEI Score	<u>'</u>
River Code: 68-200 RM: 49 Stream M. F. L. BOWER CR.	
Date 07/599 Location LUSK LOCK AREA - BENER STATE PARK	
Scorers Initials: DIA Comments 44T/LONG: 40 44 15/80 39 59	
1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % present);	
TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE ORIGIN SUBSTRATE QUALITY	
Check ONE (OR 2 & AVERAGE)Check ONE (OR 2 &	AVERAGE)
DD-BOULDER [9] DD-SAND [6] D-LIMESTONE [1] SILT:	Substrate
MG-COBBLE [8] G-BEDROCK[5] & TILLS [1] MG-SILT MODERATE [-1]	
	11 11
	ليب
□□-SILT [2]	Max 20
score on natural substrates)  Secore on natural substrates)	•
NUMBER OF SUBSTRATE TYPES: D-4 or Less [0] D-SHALE [-1] D-NONE [1]	
COMPENTS	
2] INSTREAM COVER (see back for instructions for additional cover scoring method)  AMOUNT: (Check ONLY One	or a
TYPE: (Check A// That Anniv) Check 2 and AVERAGE)	Cover
UNDERCUT BANKS [1] A Z POOLS> 70 cm [2] O OXBOWS, BACKWATERS [1] D EXTENSIVE > 75% [11]	-{[
OOVERHANGING VEGETATION [1] OROOTWADS [1] OAQUATIC MACROPHYTES [1] TOMODERATE 25-75% [7]	
2 SHALLOWS (IN SLOW WATER) [1] 2 BOULDERS [1] 1 LOGS OR WOODY DEBRIS [1] 0 SPARSE 5-25% [3]	
☐ROOTMATS [1] COMMENTS: ☐ - NEARLY ABSENT < 5%[1]	]
3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)	Charnel
SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER	Channel
O-HIGH [4] O-EXCELLENT [7] A-NONE [6] S-HIGH [3] O-SNAGGING O-MPOUND.	7
MODERATE [3] MODERATE [3] O-RECOVERED [4] O-MODERATE [2] O-RELOCATION O-ISLANDS	لينيا
ALOW [2] G-FAIR [3] G-RECOVERING [3] G-LOW [1] G-CANOPY REMOVAL G-LEVEED  G-NONE [1] G-POOR [1] G-RECENT OR NO G-DREDGING G-BANK SHAPING	Max 20
D-MONE[1] D 100M[1]	•
COWNENTS:	
AS DIDADIAN ZONE AND RANK EDOSION (check ONE how per bank or check 2 and AVERAGE per bank) **River Right Looking (	Downstream★
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) **River Right Looking (	
RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) BANK EROSION	Downstream★ Riparian
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  L R (Per Bank)	Riparian
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  S Ø FOREST, SWAMP [3]  BANK EROSION  L R (Per Bank)  L R (Per Bank)	Riparian
RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) D MODERATE 10-50m [3] D -SHRUB OR OLD FIELD [2] D -RESIDENTIAL, PARK, NEW FIELD [1] D -RESIDENTIAL, PARK	Riparian
RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) D D-MODERATE 10-50m [3] D -SHRUB OR OLD FIELD [2] D -RESIDENTIAL, PARK, NEW FIELD [1] D D-RESIDENTIAL, PARK, PARK, PARK, PARK, PARK, PARK, PARK, PARK, PARK, PARK, PARK, PARK, PARK, PARK, PARK, PARK, PARK, PAR	Riparian
RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) D MODERATE 10-50m [3] D -SHRUB OR OLD FIELD [2] D -RESIDENTIAL, PARK, NEW FIELD [1] D -RESIDENTIAL, PARK	Riparian
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  L R (Per Bank)  D D-CONSERVATION TILLAGE [1]  D D-SHRUB OR OLD FIELD [2]  D D-RESIDENTIAL, PARK, NEW FIELD [1]  D D-FENCED PASTURE [1]  D D-HEAVY/SEVERE  D D-WINING/CONSTRUCTION [0]	Riparian
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  D D-CONSERVATION TILLAGE [1]  D D-SHRUB OR OLD FIELD [2]  D D-RESIDENTIAL, PARK, NEW FIELD [1]  D D-RESIDENTIAL, PARK, NEW FIELD [1]  D D-NONE [0]  COM-MENTS:	Riparian
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Ban	Riparian 11 Max 10
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D G FOREST, SWAMP [3]  D -SHRUB OR OLD FIELD [2]  D -NARROW 5-10 m [2]  D -RESIDENTIAL, PARK, NEW FIELD [1]  D -FENCED PASTURE [1]  D -FENCED PASTURE [1]  D -FENCED PASTURE [1]  D -FENCED PASTURE [1]  D -WONE [0]  COM-  MENTS:  5.] POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  L R (Most Predominant Per Bank)  L R (Per Bank)  D -MODERATE [1]  D -SHRUB OR OLD FIELD [1]  D -HEAVY/SEVERE  D -WINNING/CONSTRUCTION [0]  CURRENT VELOCITY [POOLS & RIFFLESI]	Riparian 11 Max 10
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D GFOREST, SWAMP [3]  D -SHRUB OR OLD FIELD [2]  D -NARROW 5-10 m [2]  D -RESIDENTIAL, PARK, NEW FIELD [1]  D -FENCED PASTURE [1]  D -FENCED PASTURE [1]  D -FENCED PASTURE [1]  D -FENCED PASTURE [1]  D -FENCED PASTURE [1]  COM- MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  (Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  L R (Most Predominant Per Bank)  L R (Per Bank)  D -CONSERVATION TILLAGE [1]  D -MODERATE [2]  D -MODERATE [2]  D -HEAVY/SEVERE  CWINING/CONSTRUCTION [0]  C	Riparian 11 Max 10
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D GFOREST, SWAMP [3]  D -SHRUB OR OLD FIELD [2]  D -NARROW 5-10 m [2]  D -RESIDENTIAL, PARK, NEW FIELD [1]  D -RESIDENTIAL, PARK, NEW FIELD [1]  D -FENCED PASTURE [1]  D -FENCED PASTURE [1]  D -FENCED PASTURE [1]  COM- MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  (Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  D -FOOL WIDTH > RIFFLE WIDTH [2]  D -TORRENTIAL[-1]  BANK EROSION  L R (Per Bank)  L R (Per B	Riparian 11 Max 10
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D S GFOREST, SWAMP [3]  D -SHRUB OR OLD FIELD [2]  D -NARROW 5-10 m [2]  D -RESIDENTIAL, PARK, NEW FIELD [1]  D -RESIDENTIAL, PARK, NEW FIELD [1]  D -FENCED PASTURE [1]  D -WONE [0]  COM- MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  (Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  D -FAST[1]  D -FAST[1]  D -FAST[1]  D -FAST[1]  M-POOL WIDTH = RIFFLE WIDTH [1]  D -FAST[1]  D -FAST[1]  D -NITERSTITIAL[-1]	Riparian 11 Max 10
RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) D G FOREST, SWAMP [3] D G-SHRUB OR OLD FIELD [2] D G-NARROW 5-10 m [2] D G-RESIDENTIAL, PARK, NEW FIELD [1] D G-RESIDENTIAL, PARK, NEW FIELD [1] D G-WIDTH BAND RIFFLE/RUN QUALITY MAX. DEPTH (Check 1 ONLY!) (Check 1 or 2 & AVERAGE) D G-POOL WIDTH > RIFFLE WIDTH [1] D G-FST[1] D G-NITERSTITIAL[-1] D	Riparian  Max 10  Pool/ Current
RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) D G FOREST, SWAMP [3] DSHRUB OR OLD FIELD [2] DNARROW 5-10 m [2] DRESIDENTIAL, PARK, NEW FIELD [1] DRESIDENTIAL, PARK, NEW	Riparian  Max 10  Pool/ Current
RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) D G FOREST, SWAMP [3] D G-SHRUB OR OLD FIELD [2] D G-NARROW 5-10 m [2] D G-RESIDENTIAL, PARK, NEW FIELD [1] D G-RESIDENTIAL, PARK, NEW FIELD [1] D G-WIDTH BAND RIFFLE/RUN QUALITY MAX. DEPTH (Check 1 ONLY!) (Check 1 or 2 & AVERAGE) D G-POOL WIDTH > RIFFLE WIDTH [1] D G-FST[1] D G-NITERSTITIAL[-1] D	Pool/ Current Max 12
RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank)  M M FOREST, SWAWP [3]  D G-CONSERVATION TILLAGE [1]  M MODERATE 10-50m [3] D -SHRUB OR OLD FIELD [2] D G-WARROW 5-10 m [2] D G-RESIDENTIAL, PARK, NEW FIELD [1] D G-WEST NARROW 5-10 m [2] D G-RESIDENTIAL, PARK, NEW FIELD [1] D G-WINNING/CONSTRUCTION [0]  COM- MENTS:  5. [POOL/GLIDE AND RIFFLE/RUN QUALITY MAX. DEPTH (Check 1 ONLY!) (Check 1 or 2 & AVERAGE) (Check 1 ONLY!) (Check 1 or 2 & AVERAGE) (Check All That Apply)  M G-POOL WIDTH = RIFFLE WIDTH [2] D G-MODERATE [1] G G-MODERATE [1] G G-MONING/CONSTRUCTION [0]  CURRENT VELOCITY [POOLS & RIFFLES!]  (Check All That Apply)  M G-POOL WIDTH = RIFFLE WIDTH [2] G G-MODERATE [1] G G-MODERATE [1] G G-MODERATE [1] G G-NORENTIAL[-1] G G-Q2-0.4m [1] G G-Q	Riparian  Max 10  Pool/ Current
RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) L	Pool/ Current Max 12
RIPARIAN WIDTH L R (Per Bank) L R (Wost Predominant Per Bank) L R (Per Bank) R (Per	Pool/ Current Max 12
RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) D C-CONSERVATION TILLAGE [1] D C-MODERATE 10-50m [3] D C-SHRUB OR OLD FIELD [2] D C-NARROW 5-10 m [2] D C-RESIDENTIAL, PARK, NEW FIELD [1] D C-NONE [0] COM- MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY MAX. DEPTH (Check 1 ONLY!) (Check 1 or 2 & AVERAGE) (Check 1 ONLY!) D C-7-1m [6] D C-7-1m [6] D C-9-00L WIDTH > RIFFLE WIDTH [1] D C-4-07m [2] D C-9-00L WIDTH > RIFFLE WIDTH [1] D C-4-07m [2] D C-MODERATE [2] D C-MODERATE [2] D C-MINING/CONSTRUCTION [0] D C-HEAVY/SEVERE  (Check All That Apply) D C-10 - EDDIES [1] D C-10 - FENCED PASTURE [1] D C-10 - FENCED PASTURE [1] D C-10 - MINING/CONSTRUCTION [0] D C-10 - MINING/CONSTRUCTI	Pool/ Current Max 12
RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) L R	Pool/ Current Max 12
RIPARIAN WIDTH L R (Per Bank) L R (Wost Predominant Per Bank) L R (Per Bank) L R (Wost Predominant Per Bank) L R (Per Bank) L	Pool/ Current Max 12 Riffle/Run Max 8
RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) R (	Pool/ Current Max 12 Riffle/Run Max 8
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  D G-FOREST, SWAMP [3]  D G-SWAMP [3]  D G-WODERATE (0-50m [4]  D G-SHRUB OR OLD FIELD [2]  D G-NODERATE (0-50m [2])  D G-SHRUB OR OLD FIELD [2]  D G-NODERATE [1]  D G-HEAVY/SEVERE  D G-VERY NARROW 5-10 m [2]  D G-RESIDENTIAL, PARK, NEW FIELD [1]  D G-POPEN PASTURE, ROWCROP [0]  COM-  MENTS:  S, IPOOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  (Check 1 ONLY!)  (Check 1 ONLY!)  MORPHOLOGY  (Check 1 ONLY!)  CO-7-1m [4]  D G-POOL WIDTH > RIFFLE WIDTH [2]  D G-FAST[1]  D G-NOTERITIAL[-1]  C-0.7-1m [4]  D G-POOL WIDTH RIFFLE WIDTH [1]  C-0.4-0.7m [2]  D G-NODERATE [1]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE DEPTH  RUN DEPTH  RUN DEPTH  RIFFLE/RUN SUBSTRATE  RIFFLE/RUN EMBEDDEDNESS  P-Sest Areas > 10 cm [2]  MAX < 50 [2]  D -MAX < 50 [2]  D -MAX < 50 [3]  D -WOOL STABLE (e.g., Large Gravel) [1]  D - EXTENSIVE [-1]  COMMENTS:  D - NO RIFFLE [Metric-0]	Pool/ Current Max 12  Riffle/Run Max 8 Gradient
RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) R (	Pool/ Current Max 12 Riffle/Run Max 8

Is Sampling Reach Representative	of the Stream (Y/N)	If Not, Explain:		·	Major Suspected Sources of Impacts (Check All That Apply):
<u> </u>	· · · · · · · · · · · · · · · · · · ·	/			None ☐ Industrial ☐ WWTP ☐
	<u> </u>				Ag 🗇 Livestock 🗇
					Silviculture 🗇 Construction 🗇
					Urban Runoff ☐ CSOs ☐
	Gear:	Distance: Water Cla	arity: Water Stage:	Canopy -% Open	Suburban Impacts  Mining
Fire Samplin	st g Pass	0,22 7/00	Low	10	Channelization  Riparian Removal
Subjective Aesthetic Average		Stream Measuremer			Landfills  Natural
Rating Rating Width	Average Maximum Depth Depth	Av. Bankfull Bankfull Mean Width Depth	W/D Bankfull Max F Ratio <u>Depth</u> A	loodprone Entrench. Area Width Ratio	Other Flow Alteration
(1-10) Gradient: (1-10)	45 cm 120cm	,			
					SAMO & GRANE WIST
Stream Drawing:					1000000000000000000000000000000000000
			Section 2		Z Modes
				,	3
	THE STORY				192/
	⊃ <u> </u>			3	
from Z					
	-				
A STATE OF THE STA		,		ر	
( ) E	ř	34			
				Yes	<del>_</del> <u>.</u>
					Is Stream Ephemeral (No pools, totally dry or only damp spots)?
Instructions for Scoring the Alternate Cov 0 - Cover type absent; 1 - Cover type pre-	cent in very small amour	ite or it more common of Marc	inai duality. Z ~ Cover	IANG I	Is There Water Upstream? How Far:
present in moderate amounts, but not of the	highest quality or in small of bighest quality cover	i amounts of nignest quality, s include verv large boulders in	deep or fast water, la	or docurry iii   Firm	Is There Water Close Downstream?
logs that are stable, well developed rootw	ads in deep/fast water, o	or deep, well-defined, function	al pools.		Is Dry Channel Mostly Natural?

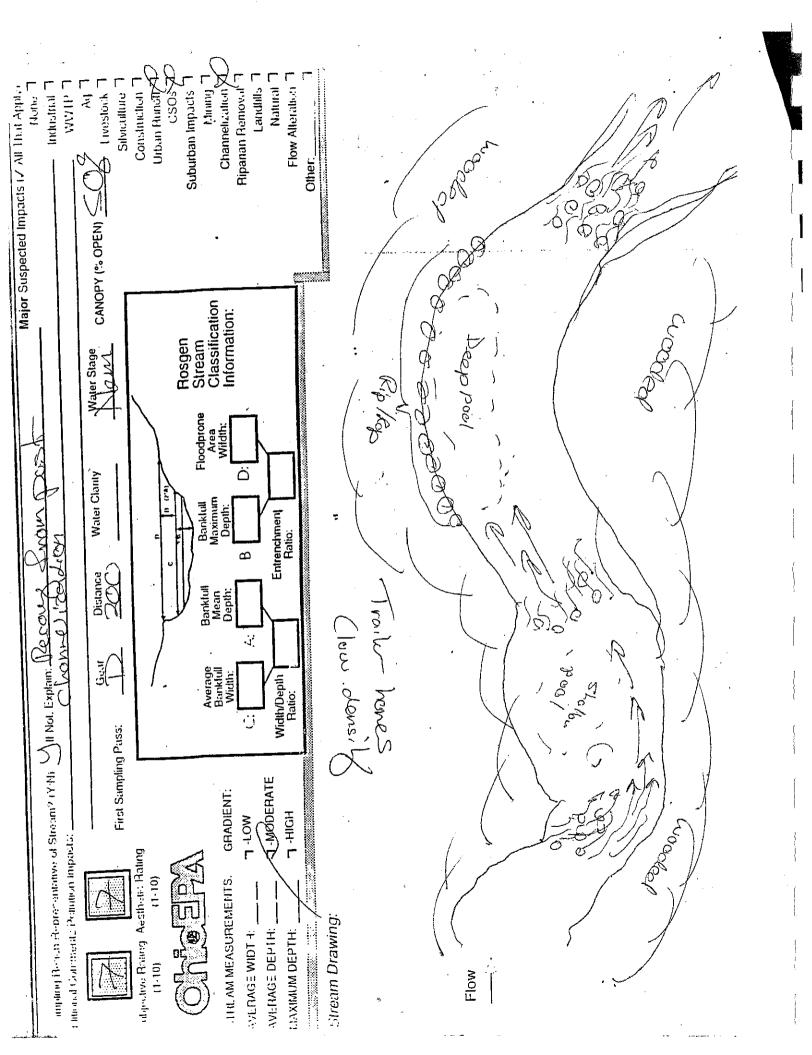
	Qualitative mabitat Evaluation index Field Choos Co	
1.	Pivor Code: 08 RM: 8, U Stream Michalo Fak Little Beauer Creak	
[	Date 7/78/09 Location det Flictoin wint Porty SR 154.	<del></del>
Ĺ	Scorers Initials: CETS Comments  1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % present);	
	TYPE POOL BIFFLE POOL RIFFLE SUBSTRATE ORIGIN SUBSTRATE QUALITY	•
<u></u>	D DBLDR /SLBS[10] D GRAVEL [7] Check ONE (OR 2 & AVERAGE)Check ONE (OR 2 &	•
{	O O-BOULDER [9] O O-SAND [6] O O-SILT HEAVY [-2]	
	TO COBBLE [8] SILT MODERATE [-	1) Substrat
[	CO O-HARDPAN (4) CO O-DETRITUS(3) CO -WETLANDS(0) CO -SILT NORMAL (0)	
ļ	DO-MUCK (2) DO-ARTIFICIAL(0) Y D-HARDPAN (0) D-SILT FREE [1]	_
*	O D-SILT [2] SANDSTONE [0] EMBEDDED O -EXTENSIVE [-2]	. Max 20
ĩ	NOTE: (Ignore sludge originating from point-sources; O-RIP/RAP [0] NESS: MODERATE [-1]	
	score on natural substrates) [5:5 or More [2]	
١ .	NUMBER OF SUBSTRATE TYPES: 10-4 or.Less [0]	
(	2] INSTREAM COVER  AMOUNT: (Check ONLY On	9.00
	TYPE: (Check All That Apply) check 2 and AVERAGE)	Cover
	SUNDERCUT BANKS [1] D-POOLS > 70 cm [2] O-OXBOWS, BACKWATERS [1] O-EXTENSIVE > 75% [11]	]
	OVERHANGING VEGETATION [1] AQUATIC MACROPHYTES [1] MODERATE 25-75% [	
	SHALLOWS (INSLOWWATER) [1] D-BOULDERS [1] STACOGS OR WOODY DEBRIS [1] SPARSE 5-25% [3]	Max 20
;	G-ROOTMATS[1] COMMENTS:	
	3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)	<b>C</b> I
	SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER	Channel
	O-HIGH[4] O-EXCELLENT[7] O-NONE[6] O-HIGH[3] O-SNAGGING O-IMPOUND.  MODERATE[3] D-GOOD[5] O-RECOVERED[4] O-MODERATE[2] O-RELOCATION O-ISLANDS	- {}
•	MODERATE[3] D-RECOVERED[4] D-MODERATE[2] D-RELOCATION D-ISLANDS D-RECOVERING[3] D-RECOVERING[3] D-LOW[1] D-CANOPYREMOVAL D-LEVEED	السيا
	G-NONE[1] G-POOR[1] G-RECENT ORNO G-DREDGING G-BANKSHAPING	Max 20
	REGOVERY[1] D-ONESIDE CHANNEL MODIFICATIONS	•
	COMMENTS:	
	4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) **River Right Looking	Downstrea
	RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) BANK EROSION	Riparian
	L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  C-CONSERVATIONTILLAGE[1]  C-NONE/LITTLE[3]	
	O:-WIDE > 50m[4] O:FOREST, SWAMP[3] O:CONSERVATION TILLAGE[1] O:CNOBE/LITTLE[3] O:MODERATE 10-50m[3] O:CI-SHRUBOR OLD FIELD [2] O:URBAN OR INDUSTRIAL [0]	
	DENARROWS 10m[2] RESIDENTIAL PARK, NEW FIELD [1] O O-OPEN PASTURE, ROWCROP [0] O O-HEAVY/SEVERE[	11 Max 10
	DD:-VERYNARROW <5m(1) DD-FENCED PASTURE [1] DD-MINING/CONSTRUCTION[0]	`•
	O O NONE[0]	
	COM-	
	MENTS:	
	5.]POOL/GLIDE AND RIFFLE/RUN QUALITY	Pool/
	MAX_DEPTH MORPHOLOGY CURRENT VELOCITY [POOLS & RIFFLESI]	Current
	(Check 1 ONLY!) (Check 1 or 2 & AVERAGE) (Check All That Apply)	
	> 1m [6] POOL WIDTH > RIFFLE WIDTH [2] . D'-EDDIES[1] D'-TORRENTIAL[-1]	()
	/CI-0.7-1m[4]	Max 12
	□-0.2-0.4m[1] □-< 0.2m [POOL=0] COMMENTS:	
	CHECK ONE OR CHECK 2 AND AVERAGE	Riffle/Rur
	RIFFLE/RUN DEPTH - RIFFLE/RUN SUBSTRATE RIFFLE/RUN EMBEDDEDNESS	
	☐- Generally > 10 cm, MAX > 50 [4] ☐-STABLE (e.g., Cobble, Boulder) [2] ☐ - NONE [2]	الييا
`	Generally > 10 cm, MAX < 50 [3] — MOD. STABLE (e.g., Large Gravel) [1] — LOW [1]	Max 8
•	Generally 5-10 cm[1] (7-UNSTABLE (Fine Gravel, Sand) [0] MODERATE [0]	Gradient
	Generally < 5 cm [RIFFLE=0]	
	TOMMENTS: ☐ - NO RIFFLE [Metric≈0]	لييا
	125 CLOCK TO	Max 10
	RADIENT (tVmi): 5.78 DRAINAGE AREA (sq.mi.): 12.5 %POOL: %GLIDE:	
	**************************************	
		7/24/97



Qualitative Habitat Evalu	uation Index Field Sheet QHEI Score:
iver Code 08 RM: 20 Stream Middle Ful	Little Brave
Date 7/28/99 Location Dange Pel. 15	+ Flyton NOUTP
Scorers Initials: CFTS Comments	
SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; E YPE POOL RIFFLE POOL RIFFLE	SUBSTRATE ORIGIN SUBSTRATE QUALITY
	heck ONE (OR 2 & AVERAGE)Check ONE (OR 2 & AVERAG
[ ] [] BOULDER [9] X X D D SAND [6] X X D	-UMESTONE [1] SILT: O -SILT HEAVY [-2]
	TILLS [1] Substra
* * * * * * * * * * * * * * * * * * *	-WETLANDS[0] C -SILT NORMAL [0]
· · · · · · · · · · · · · · · · · · ·	-HARDPAN [0] O -SILT FREE [1] SANDSTONE [0] EMBEDDED O -EXTENSIVE [-2]
· · · · · · · · · · · · · · · · · · ·	SANDSTONE (0) EMBEDDED (1 -EXTENSIVE (-2)  -RIP/RAP (0) NESS: MODERATE (-1)
	-LACUSTRINE [0] -NORMAL [0]
	-SHALE [-1]
	COAL FINES [-2]
2] INSTREAM COVER	AMOUNT: (Check ONLY One or Cover
TYPE: (Check All That Apply)  SUNDERCUT BANKS [7]  OCPOOLS > 70 cm [2] U -1	check 2 and AVERAGE)  OXBOWS, BACKWATERS [1] O - EXTENSIVE > 75%-[1-1]
O -OVERHANGING VEGETATION [1] ROOTWADS [1]	AQUATIC MACROPHYTES [1] A MODERATE 25 75% [7]
	OGSORWOODY DEBRIS[1] D-SPARSE 5-25% [3] Max 20
GEROOTMATS[1] COMMENTS:	O-NEARLYABSENT < 5%[1]
3] CHANNEL MORPHOLOGY: (Check ONLY One PER Catego	
	TABILITY MODIFICATIONS/OTHER Channel
	D-HIGH [3] D-SNAGGING D-IMPOUND.  DAMODERATE [2] D-RELOCATION D-ISLANDS
	J-LOW[1] D-CANOPYREMOVAL D-LEVEED Max 20
D-NONE[1] D-POOR[1] D-RECENT ORNO	O-DREDGING O-BANKSHAPING
REGOVERY[1]	O-ONESIDECHANNELMODIFICATIONS
COMMENTS:	
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank	
	TV /BACT 100 A/man DIRADIANI) DANIV EDOCIONI
RIPARIAN WIDTH FLOOD PLAIN QUALL	TY (PAST 100 Meter RIPARIAN) BANK EROSION Riparian
RIPARIAN WIDTH FLOOD PLAIN QUALI  L R (Per Bank)  L R (Most Predominant Per Bank)	TV /BACT 100 A/man DIRADIANI) DANIV EDOCIONI
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D-FOREST, SWAMP[3]  MODERATE 10-50m[3]  D-SHRUBOR OLD FIELD [2]	TY (PAST 100 Meter RIPARIAN)  L R  C C-CONSERVATIONTILLAGE[1]  D-URBAN ORINDUSTRIAL[0]  BANK EROSION  Riparian  Riparian  O D-MODERATE[2]
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D'-WIDE > 50m[4]  D'-FOREST, SWAMP[3]  MODERATE 10-50m[3]  D'ARESIDENTIAL PARK, NEW FIELD [1]	TY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  C CONSERVATIONTILLAGE[1]  C C CONSERVATIONTILLAGE[1]  C C C C C C C C C C C C C C C C C C C
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D'-WIDE > 50m[4]  D'-FOREST, SWAMP[3]  D'-MODERATE 10-50m[3]  D'-SHRUB OR OLD FIELD [2]  D'ARESIDENTIAL PARK, NEW FIELD [1]  D'-VERYNARROW < 5m[3]  D'-FENCED PASTURE [1]	TY (PAST 100 Meter RIPARIAN)  L R  C C-CONSERVATIONTILLAGE[1]  D-URBAN ORINDUSTRIAL[0]  BANK EROSION  Riparian  Riparian  O D-MODERATE[2]
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D-FOREST, SWAMP[3]  MODERATE 10-50m[3]  MODERATE 10-50m[3]  MRESIDENTIAL PARK, NEW FIELD [1]  D-FENCED PASTURE [1]  D-FENCED PASTURE [1]	TY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  C CONSERVATIONTILLAGE[1]  C C CONSERVATIONTILLAGE[1]  C C C C C C C C C C C C C C C C C C C
RIPARIAN WIDTH  L R (Per Bank)  C C C C C C C C C C C C C C C C C C C	TY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  C CONSERVATIONTILLAGE[1]  C C CONSERVATIONTILLAGE[1]  C C C C C C C C C C C C C C C C C C C
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D'-WIDE > 50m[4]  D'-FOREST, SWAMP[3]  D'-WODERATE 10-50m[3]  D'ARESIDENTIAL PARK, NEW FIELD [1]  D'-VERYNARROW < 5m[3]  D'-FENCED PASTURE [1]  D'-NONE[0]  COM-MENTS:	TY (PAST 100 Meter RIPARIAN)  L R  C CONSERVATIONTILLAGE[1]  C C-CONSERVATIONTILLAGE[1]  Max 10  C C-CONSERVATIONTILLAGE[1]
RIPARIAN WIDTH  L R (Per Bank)  C C C C C C C C C C C C C C C C C C C	TY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  C CONSERVATIONTILLAGE[1]  C C CONSERVATIONTILLAGE[1]  C C C C C C C C C C C C C C C C C C C
RIPARIAN WIDTH  L R (Per Bank)  C	TY (PAST 100 Meter RIPARIAN)  L R  C C C C C C C C C C C C C C C C C C
RIPARIAN WIDTH  L R (Per Bank)  U -WIDE > 50m[4]  D -FOREST, SWAMP[3]  D	TY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Per Bank)  CONSERVATIONTILLAGE[1]  COURSENATION TILLAGE[1]  COURSENATURE, ROWCROP[0]  COURSENATURE, ROWCROP[0]  COURSENT VELOCITY [POOLS & RIFFLES I]  (Check All That Apply)  COURSENT COURSENTIAL[-1]
RIPARIAN WIDTH  L R (Per Bank)  U - MDE > 50m[4]  D'-MOE > 50m[4]  D'-MODERATE 10-50m[3]  D'-SHRUBOR OLD FIELD [2]  MODERATE 10-50m[3]  D'-VERYNARROW < 5m[ii]  D'-VERYNARROW < 5m[ii]  D'-FENCED PASTURE [1]  COM- MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  (Check 1 ONLY!)  Check 1 or 2 & AVERAGE)  D-POOL WIDTH > RIFFLE WIDTH [2]	TY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Per Bank)  D-CONSERVATIONTILLAGE[1]  D-WODERATE[2]  D-MODERATE[2]  Max 10  CURRENT VELOCITY [POOLS & RIFFLES!]  (Check All That Apply)  D'-EDDIES[1]  D'-INTERSTITIAL[-1]  Max 12
RIPARIAN WIDTH  L R (Per Bank)  U	TY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Per Bank)  D-CONSERVATIONTILLAGE[1]  D-WODERATE[2]  D-MODERATE[2]  Max 10  CURRENT VELOCITY [POOLS & RIFFLES!]  (Check All That Apply)  D-FAST[1]  D-FAST[1]  Max 12
RIPARIAN WIDTH  L R (Per Bank)  U -WDE > 50m[4]  U -FOREST, SWAMP[3]  U	TY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Per Bank)  D-CONSERVATIONTILLAGE[1]  D-WODERATE[2]  D-MODERATE[2]  Max 10  CURRENT VELOCITY [POOLS & RIFFLES!]  (Check All That Apply)  D'-EDDIES[1]  D'-INTERSTITIAL[-1]  Max 12
RIPARIAN WIDTH  L R (Per Bank)  U	TY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Per Bank)  D-CONSERVATIONTILLAGE[1]  D-WODERATE[2]  D-MODERATE[2]  Max 10  CURRENT VELOCITY [POOLS & RIFFLES!]  (Check All That Apply)  D-FAST[1]  D-FAST[1]  Max 12  Max 12
RIPARIAN WIDTH  L R (Per Bank)  UWIDE > 50m[4]  DWIDE > 50m[4]  CHECK ONE OR CH	TY (PAST 100 Meter RIPARIAN)  L R  C (Per Bank)  C CONSERVATIONTILLAGE[1]  C URREAN ORINDUSTRIAL[0]  C URREAT VELOCITY [POOLS & RIFFLES!]  (Check All That Apply)  C FAST[1]  C
RIPARIAN WIDTH  L R (Per Bank)  C - WIDE > 50m[4]  C - WIDE > 50m[4]  C - WIDE > 50m[4]  C - WIDE > 50m[4]  C - SHRUB OR OLD FIELD [2]  C - VERYNARROW > 5m[ii]  C - VERYNARROW > 5m[ii]  C - VERYNARROW > 5m[ii]  C - VERYNARROW > 5m[ii]  C - VERYNARROW > 5m[ii]  C - VERYNARROW > 5m[ii]  C - NONE[0]  COM-  MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  (Check 1 ONLY!)  C - None[6]  C - POOL WIDTH > RIFFLE WIDTH [2]  C - O.2-0.4m[1]  C - O.2-0.4m[1]  C - C - C - C - C - C - C - C - C - C	TY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Per Bank)  D-CONSERVATIONTILLAGE[1]  D-WODERATE[2]  D-MODERATE[2]  Max 10  CURRENT VELOCITY [POOLS & RIFFLES!]  Check All That Apply)  CHECK 2 AND AVERAGE  RIFFLE RIFFLE RIFFLE RIFFLES!  Riffle/Run  Riparian  Ripari
RIPARIAN WIDTH  L R (Per Bank)  U -WIDE > 50m[4]  WMODERATE 10-50m[3]  W	TY (PAST 100 Meter RIPARIAN)  L R  L R (Per Bank)  D-CONSERVATIONTILLAGE[1]  D-WODERATE[2]  D-MODERATE[2]  Max 10  CURRENT VELOCITY [POOLS & RIFFLESI]  Check All That Apply)  CHECK 2 AND AVERAGE  RIFFLE RIPARIAN  Riparian  Rip
RIPARIAN WIDTH  L R (Per Bank)  UWIDE > 50m[4]  WMODERATE 10-50m[3]	TY (PAST 100 Meter RIPARIAN)  L R  L R (Per Bank)  D-CONSERVATIONTILLAGE[1]  D-URBANORINDUSTRIAL[0]  D-MODERATE[2]  Max 10  CURRENT VELOCITY [POOLS & RIFFLESI]  (Check All That Apply)  D'-FAST[1]  D'-INTERSTITIAL[-1]  Max 12  Riffle/Run  Riparian  Pool/  Current  (Check All That Apply)  D'-FAST[1]  D'-INTERSTITIAL[-1]  Max 12  Riffle/Run  Riffle/Run  Run Substrate  Run Substrate  Riffle/Run Embeddedness  Boulder) [2]  Boulder] [1]  Right Run  Riffle/Run  Rif
RIPARIAN WIDTH	TY (PAST 100 Meter RIPARIAN)  L R  C (Per Bank)  C CURRENT VELOCITY [POOLS & RIFFLES!]  C CHECK All That Apply)  C'-FAST[1]  C'-FAST[1]  C'-FAST[1]  C'-FAST[1]  C'-FAST[1]  C'-INTERNITIAL[-1]  Max 12  Riparian  Pool/  Current  (Check All That Apply)  C'-FAST[1]  C'-INTERNITIAL[-1]  Max 12  Riffle/Run  Rif
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  G-WDE>50m[4]  G-FOREST, SWAMP[3]  G-SHRUBOR OLD FIELD [2]  MACLINARROWS-10m[2]  G-SHRUBOR OLD FIELD [2]  G-POST OLD FENCED PASTURE [1]  G-FENCED PASTURE PASTURE PASTURE PASTURE PASTURE PASTURE PASTURE PASTURE PASTURE PASTURE PASTURE PASTURE PASTURE PASTURE PASTUR	TY (PAST 100 Meter RIPARIAN)  L R  L R (Per Bank)  D-CONSERVATIONTILLAGE[1]  D-URBANORINDUSTRIAL[0]  D-MODERATE[2]  Max 10  CURRENT VELOCITY [POOLS & RIFFLESI]  (Check All That Apply)  D'-FAST[1]  D'-INTERSTITIAL[-1]  Max 12  Riffle/Run  Riparian  Pool/  Current  (Check All That Apply)  D'-FAST[1]  D'-INTERSTITIAL[-1]  Max 12  Riffle/Run  Riffle/Run  Run Substrate  Run Substrate  Riffle/Run Embeddedness  Boulder) [2]  Boulder] [1]  Right Run  Riffle/Run  Rif
RIPARIAN WIDTH	TY (PAST 100 Meter RIPARIAN)  L R  CONSERVATIONTILLAGE[1]  CONSERVATIONTILLAGE[1]  CONSERVATIONTILLAGE[1]  CONSERVATIONTILLAGE[1]  CONSERVATIONTILLAGE[1]  CONSERVATIONTILLAGE[1]  CONSERVATIONTILLAGE[1]  CONSTRUCTION[0]  CURRENT VELOCITY [POOLS & RIFFLESI]  (Check All That Apply)  CONSTRUCTION[0]  CURRENT VELOCITY [POOLS & RIFFLESI]  (Check All That Apply)  CONSTRUCTION[0]  CURRENT VELOCITY [POOLS & RIFFLESI]  (Check All That Apply)  CONSTRUCTION[0]  CURRENT VELOCITY [POOLS & RIFFLESI]  (Check All That Apply)  CONSTRUCTION[0]  C
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  G-WDE>50m[4]  G-FOREST, SWAMP[3]  G-SHRUBOR OLD FIELD [2]  MACLERATE 10-50m[3]  G-SHRUBOR OLD FIELD [2]  MACLERATE 10-50m[2]  G-SHRUBOR OLD FIELD [2]  MACLERATE 10-50m[2]  G-SHRUBOR OLD FIELD [2]  MACLERATE 10-50m[2]  G-FENCED PASTURE [1]  G-FENCED PASTURE [1]  G-FENCED PASTURE [1]  G-FENCED PASTURE [1]  MORPHOLOGY  (Check 1 or 2 & AVERAGE)  G-POOL WIDTH > RIFFLE WIDTH [2]  G-POOL WIDTH > RIFFLE WIDTH [1]  G-O.2-0.4m[1]  Y (PAST 100 Meter RIPARIAN)  L R  (Per Bank)  L R (Per Bank)  D-CONSERVATIONTILLAGE[1]  D-MODERATE[2]  D-MODERATE[2]  Max 10  CURRENT VELOCITY [POOLS & RIFFLES!]  (Check All That Apply)  D'-EDDIES[1]  D'-TORRENTIAL[-1]  Max 12  Max 12  Max 12  Pool/ Current  (Check All That Apply)  D'-FAST[1]  D'-INTERSTITIAL[-1]  Max 12  Max 12  Riffle/Run  HECK 2 AND AVERAGE  RUN SUBSTRATE  Bble, Boulder) [2]  D-NONE [2]  D-LOW [1]  Max 8  Gravel, Sand) [0]  D'-MODERATE [0]  Gradient  Max 10  Max 10	
RIPARIAN WIDTH	TY (PAST 100 Meter RIPARIAN)  L R  CONSERVATIONTILLAGE[1]  CONSERVATIONTILLAGE[1]  CONSERVATIONTILLAGE[1]  CONSERVATIONTILLAGE[1]  CONSERVATIONTILLAGE[1]  CONSERVATIONTILLAGE[1]  CONSERVATIONTILLAGE[1]  CONSTRUCTION[0]  CURRENT VELOCITY [POOLS & RIFFLESI]  (Check All That Apply)  CONSTRUCTION[0]  CURRENT VELOCITY [POOLS & RIFFLESI]  (Check All That Apply)  CONSTRUCTION[0]  CURRENT VELOCITY [POOLS & RIFFLESI]  (Check All That Apply)  CONSTRUCTION[0]  CURRENT VELOCITY [POOLS & RIFFLESI]  (Check All That Apply)  CONSTRUCTION[0]  C

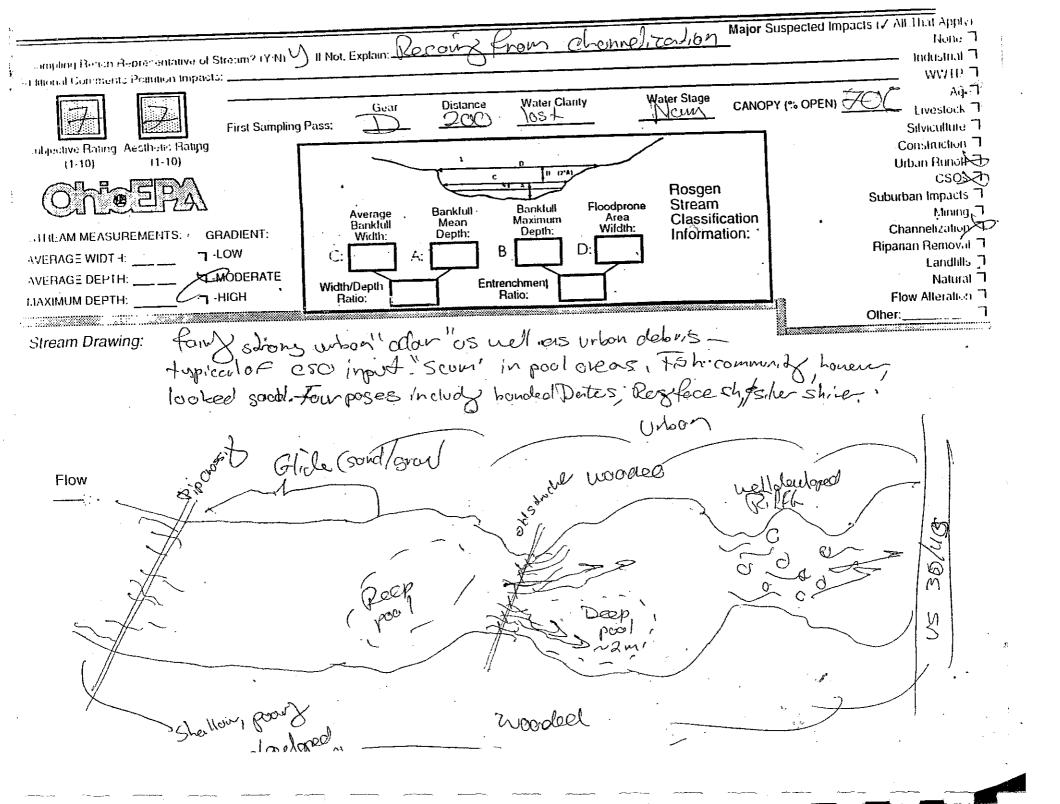


Qualitative	Habitat Evaluation Index Field Sheet QHEI Score:	
Piver Cope 98 RM: 1 Stream	middle Fik THE ROWES.	
Date 8/5/99 Location UST Pe	ering soud and proved-adison 154	
Scorers Initials: CECS Com  1] SUBSTRATE (Check ONLY Two Substi	nments TVPE BOVES, Estimate % accounts	
TYPE POOL RIFFLE	POOL RIFFLE SUBSTRATE ORIGIN SUBSTRATE QUALITY	160
O O-BLDR /SLBS[10] O O-GRAVE		/ERAGE
O Q-BOULDER (9) X X O D-SAND (	[6] UMESTONE [1] SILT: O-SILT HEAVY [-2]	
COBBLE [8]	Could The Market [1]	Substrate
O O-HARDPAN [4] O O-DETRIT		<u>'</u>
0 0-SILT [2] ·	TANDSTONE IN EMPEDED OF EXTENSIVE ( 2)	ليب
NOTE : (Ignare sludge originating from point-sources	S: O-RIP/RAP [0] NESS: MODERATE [-1]	Max 20
score on natural substrates) 25 or M	10re [2] I -LACUSTRINE [0] STANORMAL [0]	
NUMBER OF SUBSTRATE TYPES: or Le		
COMMENTS	[]-COAL FINES [-2]	
2] INSTREAM COVER  TYPE: (Check All The	AMOUNT: (Check ONLY One or check 2 and AVERAGE)	Cover
	OLS > 70 cm [2] O -OXBOWS, BACKWATERS [1] O - EXTENSIVE > 75% [11]	
O OVERHANGING VEGETATION [HE RO		الييا
	and the state of t	Max 20
G-ROOTMATS[1] COMMENTS:	D-NEARLYABSENT < 5%[1]	
	ILY One PER Category OR check 2 and AVERAGE)  ANNELIZATION STABILITY MODIFICATIONS/OTHER	hannel
	HANNEIZATION STABILITY MODIFICATIONS/OTHER C NONE[6] D_HIGH [3] D-SNAGGING D-IMPOUND. [	<del>-</del>
	RECOVERED [4] D-MODERATE [2] O-RELOCATION O-ISLANDS	
	The second of th	Max 20
	RECENT OR NO II-DREDGING II-BANKSHAPING	
_	GOVERY[1] G-ONESIDE G-IANNEL MODIFICATIONS	
COMMENTS: FANK FROSION (A) PIPAPIAN ZONE AND BANK FROSION (A)	theck ONE box per bank or check 2 and AVERAGE per bank) *River Right Looking Dow	
		mstrea
•	FLOOD BLANK OUTLING (BACT TOO MALE BIBABIAN) BAKIN EDOCION	
RIPARIAN WIDTH	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Diminant Per Bank)  L R (Per Bank)  C	iparian
RIPARIAN WIDTH L R (Per Bank) C C -WIDE > 50m[4] L R (Most Predo	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Diminant Per Bank)  L R  L R (Per Bank)  AMP[3]  D-CONSERVATIONTILLAGE[1]  D-NONE/LITILE[3]	
RIPARIAN WIDTH  L R (Per Bank)	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Diminant Per Bank)  L R  L R (Per Bank)  AMP[3]  DI-CONSERVATIONTILLAGE[1]  DI-MONE/LITTLE[3]  DI-MODERATE[2]	iparian
RIPARIAN WIDTH  L R (Per Bank)  C G G-MOE>50m[4]  D-MODERATE 10-50m[3]  D-SHRUBORO  D-MARROW5-10m[2]  D-SESIDENTIAL	ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Diminant Per Bank)  L R (Per Bank)  AMP[3]  DI-CONSERVATIONTILLAGE[1]  DI-MONE/LITILE[3]  DI-MODERATE[2]  L PARK, NEW FIELD [1]  DI-OPEN PASTURE, ROWCROP[0]  DI-HEAVY/SEVERE[1]	
RIPARIAN WIDTH  L R (Per Bank)  D -MOE>50m[4]  D -MODERATE 10-50m[3]  D -SHRUB OR O  D NARROW 5-10m[2]  D -FENCED PASSING D -FENCED P -FEN	ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Diminant Per Bank)  L R (Per Bank)  AMP[3]  DI-CONSERVATIONTILLAGE[1]  DI-MONE/LITILE[3]  DI-MODERATE[2]  L PARK, NEW FIELD [1]  DI-OPEN PASTURE, ROWCROP[0]  DI-HEAVY/SEVERE[1]	iparian
RIPARIAN WIDTH  L R (Per Bank)	ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Diminant Per Bank)  L R (Per Bank)  AMP[3]  DI-CONSERVATIONTILLAGE[1]  DI-MONE/LITILE[3]  DI-MODERATE[2]  L PARK, NEW FIELD [1]  DI-OPEN PASTURE, ROWCROP[0]  DI-HEAVY/SEVERE[1]	iparian
RIPARIAN WIDTH  L R (Per Bank)  C C C C C C C C C C C C C C C C C C C	ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Diminant Per Bank)  L R (Per Bank)  AMP[3]  DI-CONSERVATIONTILLAGE[1]  DI-MONE/LITILE[3]  DI-MODERATE[2]  L PARK, NEW FIELD [1]  DI-OPEN PASTURE, ROWCROP[0]  DI-HEAVY/SEVERE[1]	iparian
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo	FLOOD PLAIN QUALITY (PAST_100 Meter RIPARIAN)  DIMINANT PER BANK   L R   L R (Per Bank)  VAMP[3]   DI-CONSERVATIONTILLAGE[1]   DI-NONE/LITTLE[3]  DIDFIELD[2]   DI-URBANORINDUSTRIAL[0]   DI-MODERATE[2]  ALPARK NEW FIELD [1]   DI-MINING/CONSTRUCTION[0]  TY  BANK FROSION  R  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  C D-NONE/LITTLE[3]  DI-NONE/LITTLE[3]	iparian
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Commant Per Bank)  L R  L R (Per Bank)  CAMP [3]  COLONSERVATIONTILLAGE [1]  COLON	iparian lax 10
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Commant Per Bank)  L R  L R (Per Bank)  CAMP [3]  CID-CONSERVATIONTILLAGE [1]  CID-MONE/LITTLE [3]  CID-FIELD [2]  CID-PARK, NEW FIELD [1]  CID-OPEN PASTURE, ROW CROP [0]  CID-HEAVY/SEVERE [1]  CID-MINING/CONSTRUCTION [0]  CORRENT VELOCITY (POOLS & RIFFLESI)  & AVERAGE)  CORRENT VELOCITY (POOLS & RIFFLESI)	iparian lax 10
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo	FLOOD PLAIN QUALITY (PAST_100 Meter RIPARIAN)  Cominant Per Bank)  L R  L R (Per Bank)  CAMP[3]  CID-CONSERVATIONTILLAGE[1]  CID-MONE/LITTLE[3]  CID-MONE/LITTLE[3]  CID-MONE/LITTLE[3]  CID-MODERATE[2]  CID-MODERATE[2]  CID-MODERATE[2]  CID-MODERATE[2]  CID-MODERATE[2]  MODERATE[2]  CID-MONE/LITTLE[3]  CID	iparian lax 10
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Cominant Per Bank)  L R  L R (Per Bank)  (AMP[3]  D-CONSERVATIONTILLAGE[1]  D-WEBANORINDUSTRIAL[0]  D-MONE/LITILE[3]  L PARK, NEWFIELD [1]  D-OPENPASTURE, ROWCROP[0]  D-HEAVY/SEVERE[1]  MINING/CONSTRUCTION[0]  FY  CORRENT VELOCITY (POOLS & RIFFLESI)  & AVERAGE)  RIFFLE WIDTH [2]  CORRENT VELOCITY (POOLS & RIFFLESI)  Check All That Apply)  PRIFFLE WIDTH [2]  FELEWIDTH[1]  D-AST[1]  D-ANTERSTITIAL[-1]  MININGROUP  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]	iparian lax 10
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Cominant Per Bank)  L R  L R (Per Bank)  (AMP[3]  D-CONSERVATIONTILLAGE[1]  D-WEBANORINDUSTRIAL[0]  D-MONE/LITILE[3]  L PARK, NEWFIELD [1]  D-OPENPASTURE, ROWCROP[0]  D-HEAVY/SEVERE[1]  MINING/CONSTRUCTION[0]  FY  CORRENT VELOCITY (POOLS & RIFFLESI)  & AVERAGE)  RIFFLE WIDTH [2]  CORRENT VELOCITY (POOLS & RIFFLESI)  Check All That Apply)  PRIFFLE WIDTH [2]  FELEWIDTH[1]  D-AST[1]  D-ANTERSTITIAL[-1]  MININGROUP  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]  MININGROUP  RIFFLE WIDTH [2]  D-ANTERSTITIAL[-1]	iparian lax 10
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Cominant Per Bank)  L R  L R (Per Bank)  (AMP[3]  D-CONSERVATIONTILLAGE[1]  D-WEBANORINDUSTRIAL[0]  D-MONE/LITILE[3]  L PARK, NEWFIELD [1]  D-MINING/CONSTRUCTION[0]  EY  CORRENT VELOCITY (POOLS & RIFFLESI)  & AVERAGE)  RIFFLE WIDTH [2]  CURRENT VELOCITY (POOLS & RIFFLESI)  Check All That Apply)  PRIFFLE WIDTH [2]  CHECK ALI THAT APPLY  CONTRIBUTION[1]  CHECK	iparian lax 10
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo  "I"-WIDE > 50m[4]  D-FOREST, SW.  D-MODERATE 10-50m[3]  D-SHRUBORO  D-SHRUBORO  D-SHRUBORO  D-SHRUBORO  D-SHRUBORO  D-SHRUBORO  D-SHRUBORO  D-SHRUBORO  D-SHRUBORO  D-SHRUBORO  D-SHRUBORO  D-SHRUBORO  D-SHRUBORO  D-SHRUBORO  D-FENCED PASS  D-F	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Commant Per Bank)  L R  L R (Per Bank)  (AMP[3]  CID-CONSERVATIONTILLAGE[1]  CID-MONE/LITTLE[3]  CID-MODERATE[2]  L PARK, NEWFIELD [1]  CID-OPENPASTURE, ROWCROP[0]  CID-HEAVY/SEVERE[1]  CID-MINING/CONSTRUCTION[0]  CY  CURRENT VELOCITY [POOLS & RIFFLES1]  CID-MINING/CONSTRUCTION[0]  CY  CURRENT VELOCITY [POOLS & RIFFLES1]  CID-MINING/CONSTRUCTION[0]  CY  CURRENT VELOCITY [POOLS & RIFFLES1]  CID-MINING/CONSTRUCTION[0]  CHeck All That Apply)  PERLEWIDTH [2]  CHECK All That Apply)  CHECK All That Apply All Tha	iparian lax 10
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo	ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Commant Per Bank)  L R  L R (Per Bank)  L R (Pe	lax 10
RIPARIAN WIDTH  L R (Per Bank)  D	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Diminant Per Bank)  L R  L R (Per Bank)  (AMP[3]  DI-CONSERVATIONTILLAGE[1]  DI-MODERATE[2]  L PARK, NEWFIELD [1]  DI-OPEN PASTURE, ROWCROP [0]  STURE [1]  CURRENT VELOCITY (POOLS & RIFFLES1)  CURRENT VELOCITY (POOLS & RIFFLES1)  RIFFLE WIDTH [2]  PER BANK EROSION  RIFFLE WIDTH [2]  CURRENT VELOCITY (POOLS & RIFFLES1)  CURRENT VELOCITY (POOLS & RIFFLES1)  CURRENT VELOCITY (POOLS & RIFFLES1)  CURRENT VELOCITY (POOLS & RIFFLES1)  CURRENT VELOCITY (POOLS & RIFFLES1)  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE WIDTH [1]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE /RUN SUBSTRATE  RIFFLE /RUN EMBEDDEDNESS  CASTABLE (e.g., Cobble, Boulder) [2]	Pool/ Unrent
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo	ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  primant Per Bank)  L R L R (Per Bank)  LAMP[3]  DIDFIELD[2]  DI-CONSERVATIONTILLAGE[1]  DI-HEAVY/SEVERE[1]  L PARK, NEW FIELD [1]  DI-OPEN PASTURE, ROW CROP[0]  L PARK, NEW FIELD [1]  DI-HEAVY/SEVERE[1]  CURRENT VELOCITY [POOLS & RIFFLES1]  CURRENT VELOCITY [POOLS & RIFFLES1]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE // RUN SUBSTRATE  RIFFLE // RU	lax 10
RIPARIAN WIDTH  L R (Per Bank)  D'-WIDE > 50m[4]  D'-MODERATE 10-50m[3]  D'-MODERATE 10-50m[3]  D'-MODERATE 10-50m[3]  D'-RESIDENTIAL  D'-VERYNARROW < 5m[1]  COM- MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALIT  MAX. DEPTH  (Check 1 ONLY!)  Check 1 ONLY!)  MAX. DEPTH  Check 1 ONLY!)  D-0.7-1m[4]  D-00L/WIDTH < RIF  D-0.4-0.7m[2]  D-0.2-0.4m[1]  D-0.2-0.4m[1]  Cenerally > 10 cm, MAX > 50 [4]  Generally > 10 cm, MAX < 50 [3]  Generally 5-10 cm[1]	FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Deminant Per Bank)  L R (Per Ba	Pool/ Unrent
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo  "-WIDE>50m[4]  D-FOREST, SW.  D-MODERATE 10-50m[3]  S-PRUBORO  T-NONE[0]  COM-  MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  (Check 1 ONLY!)  Check 1 ONLY!)  Check 1 ONLY!)  Check 1 ONLY!)  Check 1 ONLY!  Check 1 O	ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  primant Per Bank)  L R  L R (Per Bank)  AMP[3]  DI-CONSERVATIONTILLAGE[1]  DI-MONE/LITILE[3]  DI-PARK, NEW FIELD [1]  DI-MINING/CONSTRUCTION[0]  EY  CURRENT VELOCITY [POOLS & RIFFLES1]  STURE[1]  CURRENT VELOCITY [POOLS & RIFFLES1]  CURRENT VELOCITY [POOLS & RIFFLES1]  CURRENT VELOCITY [POOLS & RIFFLES1]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE/RUN SUBSTRATE  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE/RUN SUBSTRATE  RIFFLE/RUN EMBEDDEDNESS  CHOOL STABLE (e.g., Cobble, Boulder) [2]  CHOOL STABLE (e.g., Large Gravel) [1]  CHECK ONE OR CHECK 2 AND [0]  CHECK OF CHECK 2 AND [0]  CHECK [Fine Grovel, Sand) [0]  CHECK [Fine Grovel, Sand) [0]  CHECK [Fine Grovel, Sand) [0]  CHECK [Fine Grovel, Sand) [0]  CHECK [Fine Grovel, Sand) [0]  CHECK [Fine Grovel, Sand) [0]  CHECK [Fine Grovel, Sand) [0]  CHECK [Fine Grovel, Sand) [0]	lax 10  Pool/ urrent  Re/Ru
RIPARIAN WIDTH  L R (Per Bank)  D'-WIDE > 50m[4]  D'-MODERATE 10-50m[3]  D'-MODERATE 10-50m[3]  D'-MODERATE 10-50m[3]  D'-MODERATE 10-50m[3]  D'-SHRUBORO  D'-NOREO  COM- MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  (Check 1 ONLY!)  Check 1 ONLY!)  MORPHOLO  (Check 1 or 2 or 2 or 2 or 3 or 3 or 3 or 3 or 3	ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  primant Per Bank)  L R  (AMP[3]  D-CONSERVATIONTILLAGE[1]  D-URBANORINDUSTRIAL[0]  L-NONE/LITTLE[3]  D-HEAW/SEVERE[1]  D-HEAW/SEVERE[1]  D-HEAW/SEVERE[1]  D-HEAW/SEVERE[1]  CURRENT VELOCITY  CORRENTIAL[-1]  FFLEWIDTH[1]  D-EAST[1]  D-HODERATE[1]  D-HODERATE[1]  D-HODERATE[1]  D-HODERATE[1]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE/RUN SUBSTRATE  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE/RUN SUBSTRATE  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE/RUN SUBSTRATE  CASTABLE (e.g., Cobble, Boulder) [2]  MADD. STABLE (e.g., Large Gravel) [1]  D-NO RIFFLE [Metric=0]	iparian lax 10  Pool/ purrent ax 12
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo  "-WIDE>50m[4]  D-FOREST, SW.  D-MODERATE 10-50m[3]  D-SHRUBORO  SHRUBORO  SHRUBORO  SHRUBORO  D-FENCED PASS  TO -VERYNARROW < 5m[1]  COM- MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  (Check 1 ONLY!)  Check 1 ONLY!)  Check 1 ONLY!)  Check 1 ONLY!)  Check 1 ONLY!  Check 1 ONL	ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  prinant Per Bank)  L R  (Per Bank)  L R (Per Ba	lax 10  Pool/ urrent  Re/Ru
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo  "-WIDE>50m[4]  D-FOREST, SW.  D-MODERATE 10-50m[3]  S-PRUBORO  T-NONE[0]  COM-  MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  (Check 1 ONLY!)  Check 1 ONLY!)  Check 1 ONLY!)  Check 1 ONLY!)  Check 1 ONLY!  Check 1 O	ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Command Per Bank)  L R  L R (Per Bank)  L R (Pe	iparian lax 10  Pool/ purrent ax 12
RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predo  "-WIDE>50m[4]  MODERATE 10-50m[3]  MO	ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  Command Per Bank)  L R  R (Per Bank)  L R (Per	iparian lax 10  Pool/ purrent ax 12



Piver Code: 08 RM: 10.9 Stream Middle Fuk Little Bacre	¥
Date & S 99 Location CIST. Lisbon CSOS / US 30/US	
Scorers Initials: CF1 Comments  1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % present);	<i></i>
TYPE POOLAIFFLE POOL RIFFLE SUBSTRATE ORIGIN SUBSTRATE QUALITY	K.
Check ONE (OR 2 & AVERAGE) Check ONE (OR 2 & AVERAGE) Check ONE (OR 2 & AV	ERAG
D-BOULDER [9] SAND [6] D-SAND [6] SAND [6] SAND [6] SOUND [1] SILT: D-SILT HEAVY [-2]	
2 /2 /2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	ubstrat
- HARDPAN [4] - O O-DETRITUS[3] - O -WETLANDS[0] - O -SILT NORMAL [0] - SILT FREE [1] - O -SILT FREE [1]	
G G SU T 121	<u></u>
NOTE: (Ignore sludge originating from point-sources; O-RIP/RAP [0] NESS: MODERATE [-1]	Max 20
score on natural substrates) Sor More [2] O -LACUSTRINE [0] O -NORMAL [0]	
NUMBER OF SUBSTRATE TYPES: 0-4 or.Less [0] 0 -SHALE [-1] 0 -NONE [1]	
COMMENTS	
2] INSTREAM COVER  AMOUNT: (Check ONLY One or TYPE: (Check All That Apply)  check 2 and AVERAGE)	Cover
☐ -UNDERCUT BANKS [1] Ø -POOLS > 70 cm [2] ☐ -OXBOWS, BACKWATERS [1] ☐ - EXTENSIVE > 75% [11]	
OVERHANGING VEGETATION [1] -ROOTWADS [1] -AQUATIC MACROPHYTES [1] MODERATE 25-75% [7]	ليب
The property of the property o	Иах 20
D-ROOTMATS[1] COMMENTS: Wash now Conseed from Substrated NEARLY ABSENT < 5%[1] 3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)	
	hannel
D-HIGH (4) D-EXCELLENT [7] D-NONE (6) XI-RIGH [3] D-SNAGGING D-IMPOUND.	
MODERATE[3] DAGOOD[5]RECOVERED[4]MODERATE[2]RELOCATIONISLANDS	
	1ax 20
II-NONE[1] II-POOR[1] II-RECENT OR NO II-DREDGING II-BANKSHAPING  RECOVERY[1] II-ONESIDE CHANNEL MODIFICATIONS	
COMMENTS: T-ONESIDECHANNELMODIFICATIONS	
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) * River Right Looking Down	nstrea
	,
L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank)	parian
	parian
O O-FOREST, SWAMP[3] O O-CONSERVATION TILLAGE[1] O O-MODERATE 10-50m/31 O O-SHRUB OR OLD FIELD [2]	parian
O O-MODERATE 10-50m/3/ O O-SHRUBOR OLD FIELD [2]	parian ax 10
□ □-MODERATE 10-50m[3] □ □-SHRUBOR OLD FIELD [2]	
O -MODERATE 10-50m[3] O O-SHRUBOR OLDFIELD[2] O O-PENPASTURE, ROWCROP[0] O O-HEAVY/SEVERE[1] O O-WINING/CONSTRUCTION[0]  O O-MODERATE 10-50m[3] O O-SHRUBOR OLDFIELD[2] O O-OPENPASTURE, ROWCROP[0] O O-HEAVY/SEVERE[1] O O-MINING/CONSTRUCTION[0]  O O-MINING/CONSTRUCTION[0]	
OD-MODERATE 10-50m[3] OD-SHRUBOR OLD FIELD [2] OD-MODERATE [2] OD-MODERATE [2] OD-MODERATE [2] OD-PENPASTURE, ROWCROP [0] OD-HEAVY/SEVERE [1] OD-MINING/CONSTRUCTION [0] OD-HEAVY/SEVERE [1] OD-HEAVY/SEVERE [1] OD-MINING/CONSTRUCTION [0] OD-HEAVY/SEVERE [1] OD-HEAV	
On-Moderate 10-50m[3] On-Shrubor old field [2] On-Moderate [2]	ax 10
D-MODERATE 10-50m[3] D-SHRUBOR OLDFIELD[2] D-OPEN PASTURE, ROWCROP [0] D-HEAVY/SEVERE[1] M-OPEN PASTURE, ROWCROP [0] D-HEAVY/SEVERE [1] D-HEAVY/SEVERE [1] D-HEAVY/SEVERE [1] D-HEAVY/SEVERE [1] D-HEAVY/SEVER	
Check 1 ONLY!)   Check 10 ONLY!   Chec	ax 10
Check 1 ONLY!   Check 10   Control	ax 10
O - MODERATE 10-50m[3]	ax 10
D-MODERATE 10-50m[3]	ax 10
D-MODERATE 10-50m[3]	ax 10
Check 1 Only!   Check 1 or 2 & Average   Check 1 only!   Check 1 or 2 & Average   Check 1 only!   Check 1 or 2 & Average   Check 1 or 2 & Averag	ax 10
Check 1 Only!   Check 1 or 2 & Average   Check All That Apply   Check All That Apply   Check 1 or 2 & Average   Check One or Check 2 and Average   Check One or Check 2 and Average   Check One or Check 2 and Average   Check One or Check 2 and Average   Check 1 or 2 & Check One or Check 2 and Average   Check 1 or 2 & Check One or Check 2 and Average   Check 1 or 2 & Check One or Check 2 and Average   Check 2 and Av	ax 10
Check 1 on Ly!   Check 1 or 2 & AVERAGE   Check All That Apply   Check 1 or 2 & AVERAGE   Check One or check 2 and AVERAGE   Check 2 and AVERAGE   Check 2 and AVERAGE   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN DEPTH   Check One or check 2 and AVERAGE   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN DEPTH   Check One or check 2 and AVERAGE   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN DEPTH   Check 1 or 2 & RIFFLE/RUN SUBSTRATE   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN EMBEDDEDNESS   RIFFLE/RUN SUBSTRATE   RIFFLE/RUN EMBEDDEDNESS	ax 10
Check 1 Only!   Check 1 or 2 & Avenage   Check One or Check 2 and Average   Check One or Check 2 and Average   Check One or Check 2 and Average   Riffle/Run embeddedness   Check One or Check 2 and Average   Riffle/Run embeddedness   Check One or Check 2 and Average   Check One or Check 2 and A	ax 10
Check 1 Only!)   Check 1 or 2 & Average)   Check All That Apply)   Check 1 Only!)   Check 1 or 2 & Average)   Check One or Check 2 and Average   Check One	ax 10
Check 1 Only!   Check 1 or 2 & Average   Check All That Apply   Check 1 or 2 & Average   Check One Or Check 2 and Average   Check 2 and Average   Check 2 and Average   Check 2 and Average   Check 2 and Average   Check 2 and	ax 10  lool/ brent ix 12
	ax 10  lool/ brent ix 12
Check one or check 2 and average   Check 2 and average   Check 2 and average   Check 2 and average   Check 2 and average   Check 2 and average   Check 2 and average   Check 2 and average   Check 2 and average   Check 2 and average   Check 2 and average   Chec	ax 10  lool/ brent ix 12
Check 1 Only!   Check 1 or 2 & Average   Check All That Apply   Check 1 or 2 & Average   Check 1 or 2 & Average   Check 1 or 2 & Average   Check 1 or 2 & Average   Check 1 or 2 & Average   Check All That Apply   Check 1 or 2 & Average   Check 1 or 2 & Average   Check All That Apply   Check 1 or 2 & Average   Check All That Apply   Check 1 or 2 & Average   Check All That Apply   Check 1 or 2 & Average   Check All That Apply   Check 1 or 2 & Average   Check All That Apply   Check 1 or 2 & Average   Check All That Apply   Check All That Apply   Check 1 or 2 & Average   Check All That Apply   Check All That Apply   Check 1 or 2 & Average   Check All That Apply   Check All That Apply   Check 1 or 2 & Average   Check All That Apply   Check All That Apply   Check 1 or 2 & Average   Check All That Apply   Check All That A	ax 10  rool/ arrent le/Rur.
D-MODERATE 10-50m[3]	ax 10  rool/ arrent le/Rur.

and the second



Qualitative Habitat Evaluation Index Field Sheet QHEI Score:	
River Code: 08-200 RM: 15.0 Stream Middle Fork Little RequireCreek	
Date 7-15-99 Location Kelch Rd bridge	
Scorers Initials: DA Comments LAT/LONG: 40 47 27 /80 48 44	
1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % present);	
TYPE POOL BIFFLE POOL RIEFLE SUBSTRATE ORIGIN SUBSTRATE QUALITY  Check ONE (OR 2 & AVERAGE) Check ONE (OR 2 & AVERAGE)	
Check ONE (OR 2 & AVERAGE) Check ONE (OR 2 & AVERAGE)  Check ONE (OR 2 & AVERAGE)  Check ONE (OR 2 & AVERAGE)  Check ONE (OR 2 & AVERAGE)	٠.
Ø□-COBBLE [8]	
O O-HARDPAN [4] O O-DETRITUS[3] WETLANDS[0] Z -SILT NORMAL [0]	
□□-MUCK [2] □ □-ARTIFICIAL[0] □ -HÄRDPAN [0] □ -SILT FREE [1] □ -SILT FREE [1]	
O-SILT [2] -SANDSTONE [0] EMBEDDED O-EXTENSIVE [-2] Max 20	
NOTE: (Ignore sludge originating from point-sources;	
score on natural substrates) 4-5 or More [2]	
NUMBER OF SUBSTRATE TYPES: O-4 or Less [0] O-SHALE [-1] O-COAL FINES [-2]	
ALACIANT COVER (see book for instructions for additional cover scoring method) ALACIANT (Check ONLY Conser	
TYPE: (Check All That Apply) check 2 and AVERAGE)	
UNDERCUT BANKS [1] A 2 POOLS > 70 cm [2] O DXBOWS, BACKWATERS [1] O EXTENSIVE > 75% [11]	
OVERHANGING VEGETATION [1] AQUATIC HACROPHYTES [1] A MODERATE 25-75% [7]	
2 SHALLOWS (IN SLOW WATER) [1] A ZBOULDERS [1] LOGS OR WOODY DEBRIS [1] - SPARSE 5-25% [3] Max 20	
ROOTMATS [1] COMMENTS: INEARLY ABSENT < 5%[1]	
3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER Channel	
SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER CHANNELIZATION STABILITY MODIFICATION STABIL	
MODERATE [3] X-GOOD [5]	
□ - LOW [2] □ - FAIR [3] □ - RECOVERING [3] □ - LOW [1] □ - CANOPY REMOVAL □ - LEVEED Max 20	
□ - NONE [1] □ - POOR [1] □ - RECENT OR NO □ - DREDGING □ - BANK SHAPING	
RECOVERY [1] ONE SIDE CHANNEL MODIFICATIONS	
COMMENTS:	
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) **River Right Looking Downstream	n★
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) **River Right Looking Downstream RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM) BANK EROSION Pingripa	n★
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)   RIPARIAN WIDTH  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)	n★
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  D (X-FOREST, SWAMP [3]  D -CONSERVATION TILLAGE [1]  D -MODERATE 10-50m [3]  D -MODERATE [2]	n★
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L. R. (Most Predominant Per Bank)  L. R. (Most Predominant Per Bank)  L. R. (Most Predominant Per Bank)  L. R. (Most Predominant Per Bank)  D. CHONSERVATION TILLAGE [1]  D MODERATE 10-50m [3]  D SHRUB OR OLD FIELD [2]  D NARROW 5-10 m [2]  D RESIDENTIAL PARK, NEW FIELD [1]  D PEN PASTURE, ROWCROP [0]  Therefore in the control of t	n★
4]. RIPARIAN ZONE ÄND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  C PER SOM [4]  C PER SOM [4]  C PER SOM [5]  C PER SOM [6]  C PER SOM [7]  C PER SOM [7]  C PER SOM [8]  C PER SO	n <del>★</del>
4]. RIPARIAN ZONE ÄND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L. R. (Per Bank)  L. R. (Most Predominant Per Bank)  L. R. (Most Predominant Per Bank)  L. R. (Per Bank)  D. C. CONSERVATION TILLAGE [1]  D. SHRUB OR OLD FIELD [2]  D. SHRUB OR OLD FIELD [1]  D. RESIDENTIAL, PARK, NEW FIELD [1]  D. FENCED PASTURE [1]  D. HEAVY/SEVERE[1]  AND PRODERATE [2]  D. HEAVY/SEVERE[1]  AND PRODERATE [2]  D. HEAVY/SEVERE[1]  D. HEAVY/SEVERE[1]	n <b>★</b> -
4]. RIPARIAN ZONE ÄND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L. R. (Per Bank)  L. R. (Most Predominant Per Bank)  L. R. (Most Predominant Per Bank)  D. C WODERATE 10-50m [3]  D SHRUB OR OLD FIELD [2]  D NARROW 5-10 m [2]  D RESIDENTIAL, PARK, NEW FIELD [1]  D FENCED PASTURE [1]  D HANNING/CONSTRUCTION [0]  COM-	n <b>★</b>
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L. R. (Per Bank)  L. R. (Most Predominant Per Bank)  L. R. (Most Predominant Per Bank)  L. R. (Per Bank)  D. CONSERVATION TILLAGE [1]  D. SHRUB OR OLD FIELD [2]  D. SHRUB OR OLD FIELD [2]  D. SHRUB OR OLD FIELD [1]  D. SHRUB OR OLD FIEL	n <b>★</b>
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  RIPARIAN WIDTH  R (Per Bank)  R (	n <b>★</b>
4]. RIPARIAN ZONE ÄND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  C CONSERVATION TILLAGE [1]  C - KODERATE 10-50m [3]  C - SHRUB OR OLD FIELD [2]  C - URBAN OR INDUSTRIAL [0]  C - OPEN PASTURE, ROWCROP [0]  C - HEAWY/SEVERE[1]  Max 10  C OM-  MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  MORPHOLOGY  C URRENT VELOCITY [POOLS & RIFFLESI]  C TRIPARIAN  A RIVER Right Looking Downstream  Riparian  Riparian  L R (Per Bank)  L R (	m <b>★</b>
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L. R. (Per Bank)  L. R. (Most Predominant Per Bank)  L. R. (Most Predominant Per Bank)  L. R. (Most Predominant Per Bank)  D. CWIDE > 50m [4]  D. CWIDE > 50m [4]  D. CWIDE > 50m [4]  D. CWIDE > 50m [4]  D. CWIDE > 50m [4]  D. CWIDE > 50m [4]  D. CWIDE > 50m [4]  D. CWIDE > 50m [4]  DWIDE = 70m [4]  DWIDE =	n <b>★</b>
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  CXFOREST, SWAMP [3]  CI-CONSERVATION TILLAGE [1]  CI-MODERATE 10-50m [3]  CI-SHRUB OR OLD FIELD [2]  CI-WERAN OR INDUSTRIAL [0]  CI-WENT NARROW 5-10 m [2]  CI-RESIDENTIAL, PARK, NEW FIELD [1]  CI-VERY NARROW <5 m [1]  CI-FENCED PASTURE [1]  COM-MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  (Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  CURRENT VELOCITY [POOLS & RIFFLESI]  CHECK 1 ONLY!)  (Check 1 or 2 & AVERAGE)  COM-MENTS:  CHECK NOTE [1]  CI-EDDIES[1]  CI-EDDIES[1]  CI-NORE [1]  Max. 12	n <b>★</b>
4]. RIPARIAN ZONE ÄND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH L R (Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) D CFOREST, SWAWP [3] DCONSERVATION TILLAGE [1] DCONSERV	n <b>★</b>
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  D CONSERVATION TILLAGE [1]  D CHONSERVATION TILLAGE [1]	n <b>★</b>
4]. RIPARIAN ZONE ÄND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  C FOREST, SWAMP [3]  C FORES	n <b>★</b>
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)	n <b>★</b>
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)	m <b>★</b>
4]. RIPARIAN ZONE ÄND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  D C-MDERATE 10-50m [4]  D -SHRUB OR OLD FIELD [2]  D -SHRUB OR OLD FIELD [2]  D -RESIDENTIAL, PARK, NEW FIELD [1]  D -FENCED PASTURE [1]  POOL/  Current  Check 1 ONLY!)  Check 1 ONLY!)  D -FENCED PASTURE [1]  D -FENCED PAS	n <b>★</b>
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L. R (Per Bank)  L. R (Most Predominant Per Bank)  L. R (Most Predominant Per Bank)  D. J MODERATE 10-50m [4]  D SOM [4]  D SOM [4]  D SOM [4]  D SOM [4]  D SHRUB OR OLD FIELD [2]  D RESIDENTIAL, PARK, NEW FIELD [1]  D VERY NARROW 5-10 m [2]  D FENCED PASTURE [1]  D FENCED PASTURE [1]  D FENCED PASTURE [1]  D SOM [6]  Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  (Check 1 or 2 & AVERAGE)  (Check 1 or 2 & AVERAGE)  D POOL WIDTH > RIFFLE WIDTH [1]  D 0.7-1m [4]  D POOL WIDTH > RIFFLE WIDTH [1]  D 0.2-0.4m [1]  D COMMENTS:  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE DEPTH  RUN DEPTH  RUN DEPTH  RUN DEPTH  RIFFLE FRUN SUBSTRATE  RIFFLE/RUN EMBEDDEDNESS  Riffle/Run  Riffle/Run  Riffle/Run  Mox 8  Mox 8  Mox 8  Mox 8  Mox 8  Mox 8	n*
4]. RIPARIAN ZONE ÄND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R	n★
4]. RIPARIAN ZONE ÄND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Per Bank)  L R (Wost Predominant Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  Riparian  Ripar	n <b>★</b>
4], RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R (Per Bank)  L R (Most Predominant Per Bank)  DM -WDD > 50m [4]  CM -WDD >	n★
4], RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R (Per Bank)  L R (Most Predominant Per Bank)  DM -WDD > 50m [4]  CM -WDD >	n*
4], RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank) reflect 2 and AVERAGE per bank) River Right Looking Downstream RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM) BANK EROSION Riparian (Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) Riparian Riparian Riparian (Per Bank) Riparian Rip	n★

Is Sampling Reach Representative of the Stream (Y/N) If Not, Explain:  Gear: Distance: Water Clarity: Water Stage: Canopy -% Open  First Sampling Pass D 0.20 >/00 ww 5	Major Suspected Sources of Impacts (Check All That Apply): None  Industrial  WWTP  Ag  Livestock  Silviculture  Construction  Urban Runoff  CSOs  Suburban Impacts  Mining  Channelization
Stream Measurements: Subjective Aesthetic Average Average Maximum Av. Bankfull Bankfull Mean W/D Bankfull Max Floodprone Entrenct Rating Rating Width Depth Width Depth Ratio Depth Area Width Ratio  Gradient:	Riparian Removal
Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where:  0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type absent; 1 - Cover type absent abs	No Is Stream Ephemeral (No pools, totalfy dry or only damp spots)?  Is There Water Upstream? How Far.
present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.	Is There Water Close Downstream? How Far:  Is Dry Channel Mostly Natural?

Qualitative Habitat Evaluation Index Field Sheet QHEI Score:
River Code: 08-200 RM; 20,9 Stream M. F. LITTLE BEAVER CR.
Date 07/499 Location 5R 538
Scorers Initials: DTA Comments LAT/LONG: 40 5/ 24/80 47 43
1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % present);
TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE ORIGIN SUBSTRATE QUALITY
Check ONE (OR 2 & AVERAGE)Check ONE (OR 2 & AVERAGE)
O O-BOULDER [9]
DD-COBBLE [8] DD-BEDROCK[5] T-TILLS [1] A-SILT MODERATE [-1] Substrate
O D-HARDPAN [4] O D-DETRITUS[3] O -WETLANDS[0] O -SILT NORMAL [0]
OD-MUCK [2] OD-ARTIFICIAL[0] O-HARDPAN [0] OSILT FREE [1] OF SAMPLE [0] ENTENDED OF SYTEME [1]
O D-SILT [2] -SANDSTONE [0] EMBEDDED & EXTENSIVE [-2] Max 20  NOTE: (Ignore sludge originating from point-sources; O RIP/RAP [0] NESS: O -MODERATE [-1]
NOTE: (Ignore studge originating from point-sources;
NUMBER OF SUBSTRATE TYPES:
COMMENTS — — — — — — — — — — — — — — — — — — —
21 INSTREAM COVER (see back for instructions for additional cover scoring method) AMOUNT (Check ONLY One or
TYPE: (Check All That Apply) check 2 and AVERAGE)
UNDERCUT BANKS [1] APOOLS> 70 cm [2] OOXBOWS, BACKWATERS [1] O - EXTENSIVE > 75% [11]
D ZOVERHANGING VEGETATION [1] D I ROOTWADS [1] D AQUATIC MACROPHYTES [1] D MODERATE 25-75% [7]
SHALLOWS (IN SLOW WATER) [1] DBOULDERS [1] ALOGS OR WOODY DEBRIS [1] A - SPARSE 5-25% [3] Max 20
ROOTMATS [1] COMMENTS:
3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)  SIND OCTAY DEVELOPMENT CHANNEL (ZATION C. STARILITY MODIFICATIONS (OTHER Channel)
SINDOSTT DEVELOPMENT CHANGED STANDING
The state of the s
Max 20  Max 20
RECOVERY [1] O - ONE SIDE CHANNEL MODIFICATIONS
COMMENTS:
CONTRICT.
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) **River Right Looking Downstream**  RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) BANK EROSION Riparian
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Most Predominant Per Bank)  Riparian  Riparian  L R (Per Bank)  Riparian  Riparian  Riparian  C -WIDE > 50m [4]
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  C -CONSERVATION TILLAGE [1]  C -MODERATE 10-50m [3]  C -MODERATE [2]  May 10
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Most Predominant Per Bank)  C R (Most Predominant Per Bank)  C R (Most Predominant Per Bank)  C R (Per Bank)
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Most Predominant Per Bank)  C R (Most Predominant Per Bank)  C R (Most Predominant Per Bank)  C R (Most Predominant Per Bank)  C R (Per Bank)  C R (Per Bank)  C R (Per Bank)  Riparian
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)
4], RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D -FOREST, SWAWP [3]  D -CONSERVATION TILLAGE [1]  D -MODERATE 10-50m [3]  D -FRESIDENTIAL, PARK, NEW FIELD [1]  D -RESIDENTIAL, PARK, NEW FIELD [1]  D -MINING/CONSTRUCTION [0]  END - MONE [0]  COM-  MENTS:  5.] POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX, DEPTH  MORPHOLOGY  A WENTS:  CURRENT VELOCITY [POOLS & RIFFLES!]  CURRENT VELOCITY [POOLS & RIFFLES!]
4], RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D - MODERATE 10-50m [3]  D - SHRUB OR OLD FIELD [2]  D - RESIDENTIAL, PARK, NEW FIELD [1]  D - VERY NARROW <5 m[1]  D - FENCED PASTURE [1]  D - MODERATE [0]  D - FENCED PASTURE [1]  D - MODERATE [0]  COM-  MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  (Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  (Check All That Apply)
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D -FOREST, SWAWP [3]  D -CONSERVATION TILLAGE [1]  D -MODERATE 10-50m [3]  D -SHRUB OR OLD FIELD [2]  D -RESIDENTIAL, PARK, NEW FIELD [1]  D -WERY NARROW -5 m[1]  D -FENCED PASTURE [1]  D -MINING/CONSTRUCTION [0]  EXAMPLE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  (Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  MISST - NONE [1]  C -EDDIES[1]  C -EDDIES[1]  C -TORRENTIAL[-1]
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Per Bank)  L R (Most Predominant Per Bank)  C R (Most Predominant Per Bank)  C R (Per Bank)  C R (Most Predominant Per Bank)  Riparian
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  RIPARIAN WIDTH  R (Per Bank)  R (P
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D - WIDE > 50m [4]  D - FOREST, SWAWP [3]  D - WODERATE 10-50m [3]  D - SHRUB OR OLD FIELD [2]  D - RESIDENTIAL, PARK, NEW FIELD [1]  D - VERY NARROW <5 m [1]  D - FENCED PASTURE [1]  D - WINNG/CONSTRUCTION [0]  AND PHOLOGY  (Check 1 ONLY!)  (Check 1 ONLY!)  (Check 1 ONLY!)  (Check 1 ONLY!)  (Check 1 ONLY!)  (Check 1 ONLY!)  (Check 1 ONLY!)  (Check 1 O'-POOL WIDTH = RIFFLE WIDTH [1]  D - FOOL WIDTH = RIFFLE WIDTH [1]  D - FOOL WIDTH = RIFFLE WIDTH [1]  D - FAST[1]  Max 12  Max 12  Max 12  Max 12
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  RIPARIAN WIDTH  R (Per Bank)  R (P
4) RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) *River Right Looking Downstream*  RIPARIAN WIDTH
4) RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  L
4) RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  D-FOREST, SWAMP [3]
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Most Predominant Per Bank)  D - WIDE > 50m [4]  D - FOREST, SWAWP [3]  D - FOREST, SWAWP [3]  D - FOREST, SWAWP [3]  D - WODERATE (10-50m [3]  D - SHRUB OR OLD FIELD [2]  D - WERNAN OR INDUSTRIAL [0]  D - WERNARROW -5 m [1]  D - FENCED PASTURE [1]  D - WERNARROW -5 m [1]  D - FENCED PASTURE [1]  MAX 10  Pool/  MENTS:  S. IPOOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  (Check 1 ONLY!)  (Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  (Check 1 or 2 & AVERAGE)  D - FONEST, SWAWP [3]  D - FANT VELOCITY [POOLS & RIFFLESI]  CURRENT VELOCITY [POOLS & RIFFLESI]  CURRENT VELOCITY [POOLS & RIFFLESI]  D - FAST[1]  D - FAST[1]  D - FAST[1]  D - FAST[1]  Max 12  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE /RUN EMBEDDEDNESS  RIFFLE /RUN EMBEDDEDNESS  RIFFLE /RUN EMBEDDEDNESS  RIFFLE /RUN EMBEDDEDNESS  RIFFLE /RUN EMBEDDEDNESS  RIFFLE /RUN EMBEDDEDNESS  A RIFFLE /RUN EMBEDDEDNESS  RIFFLE /RUN EMBEDDEDNESS  RIFFLE /RUN EMBEDDEDNESS
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  G-FOREST, SWAMP [3]  G-FOREST, SWAMP [3]  G-FOREST, SWAMP [3]  G-SHRUB OR OLD FIELD [2]  G-POSERVATION TILLAGE [1]  ARG -NONE/LITTLE [3]  G-NODERATE (10-50m [3])  G-HEAWY/SEVERE[1] Max 10  G-RESIDENTIAL PARK, NEW FIELD [1]  G-POSERVATION TILLAGE [1]  G-POSERVATION TILLAGE [1]  G-NODERATE [2]  G-NODERATE [2]  G-NODERATE [2]  G-NODERATE [2]  G-NODERATE [2]  G-NODERATE [2]  G-HEAWY/SEVERE[1] Max 10  G-HEAWY/SEVERE[1] Max 10  G-HEAWY/SEVERE[1] Max 10  G-WAND DEPTH  MORPHOLOGY  MORPHOLOGY  (Check 1 ONLY!)  (Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  (Check AII That Apply)  M-NODERATE [1]  G-POOL WIDTH > RIFFLE WIDTH [1]  G-AOT-IM [4]  G-POOL WIDTH = RIFFLE WIDTH [1]  G-AOT-IM [4]  G-POOL WIDTH = RIFFLE WIDTH [1]  G-AOT-IM [4]  G-POOL WIDTH = RIFFLE WIDTH [1]  G-AOT-IM [4]  G-POOL WIDTH = RIFFLE WIDTH [1]  G-AOT-IM [4]  G-POOL WIDTH = RIFFLE WIDTH [1]  G-AOT-IM [4]  G-POOL WIDTH = RIFFLE WIDTH [1]  G-AOT-IM [4]  G-POOL WIDTH = RIFFLE WIDTH [1]  G-AOT-IM [4]  G-POOL WIDTH = RIFFLE WIDTH [1]  G-AOT-IM [4]  G-POOL WIDTH = RIFFLE WIDTH [1]  G-AOT-IM [4]  G-POOL WIDTH = RIFFLE WIDTH [1]  G-AOT-IM [4]  G-POOL WIDTH = RIFFLE WIDTH [1]  G-AOT-IM [4]  G-POOL WIDTH = RIFFLE WIDTH [1]  G-AOT-IM [4]  RIFFLE DEPTH  RIFFLE DEPTH  RIFFLE DEPTH  RIFFLE ARM SUBSTRATE  RIFFLE RIFFLE RUN EMBEDDEDNESS  RIFFLE RUN EMBEDDEDNESS  RIFFLE RUN EMBEDDEDNESS  RIFFLE RUN EMBEDDEDNESS  RIFFLE RUN EMBEDDEDNESS  MAX 8  MAX 8
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM) L R (Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) D - WIDE > 50m [4] D - FORRET, SWAWP [3] D - CONSERVATION TILLAGE [1] D - SHRUB OR OLD FIELD [2] D - VERY NARROW 5-10 m [2] D - RESIDENTIAL PARK, NEW FIELD [1] D - MINING/CONSTRUCTION [0]  MAX - NONE [0] COM- MENTS:  5.POOL/GLIDE AND RIFFLE/RUN QUALITY MAX DEPTH MORPHOLOGY CHECK ONE OR CHECK 2 AND AVERAGE CHECK ONE OR CHECK 2 AND AVERAGE RIFFLE MIDTH [1] D - 4-0.7 m [4] C - 0.2 m [POOL=0] COM-MENTS:  CHECK ONE OR CHECK 2 AND AVERAGE RIFFLE/RUN EMBEDDEDNESS CHECK ONE OR CHECK 2 AND AVERAGE RIFFLE/RUN EMBEDDEDNESS CHECK ONE OR CHECK 2 AND AVERAGE CHECK ONE OR CHECK 2 AND AVERAGE RIFFLE/RUN EMBEDDEDNESS CHECK ONE OR CHECK 2 AND AVERAGE CHECK ONE OR CHECK 2 AND AVERAGE CHECK ONE OR CHECK 2 AND AVERAGE CHECK ONE OR CHECK 2 AND AVERAGE CHECK ONE OR CHECK 2 AND AVERAGE CHECK ONE OR CHECK 2 AND AVERAGE CHECK ONE OR CHECK 2 AND AVERAGE CHECK ONE OR CHECK 2 AND AVERAGE CHECK ONE OR CHECK 2 AND AVERAGE RIFFLE/RUN EMBEDDEDNESS CHECK ONE OR CHECK 2 AND AVERAGE CHECK ONE OR CHECK 2 AND AV
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM) L R (Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) C - CONSERVATION TILLAGE [1] C - MODERATE 10-50m [3] C - SHRUB OR OLD FIELD [2] C - SH
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  Riparian  Riparian  R
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L. R. (Wost Predominant Per Bank)  L. R. (Wost Predominant Per Bank)  L. R. (Wost Predominant Per Bank)  L. R. (Wost Predominant Per Bank)  L. R. (Wost Predominant Per Bank)  L. R. (Wost Predominant Per Bank)  L. R. (Per Bank)  Riparian  Ri
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  Riparian  Riparian  R

Is Sampling	Reach Repres	entative o	of the Str	eam (Y/N) <sub>.</sub> ′	✓ If Not, Exp	lain:	:	. , , , , , , , , , , , , , , , , , , ,	lmp	water Suspected Sources of pacts (Check All That Apply): None ☐
		1								Industrial 🗇 WWTP 🗇 Ag 🗇
				•						Livestock ☐ Silviculture ☐ Construction ☐
										Urban Runoff ☐ CSOs ☐
		F*:1		Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -%	Open	Suburban Impacts  Mining
	,	First Sampling	Pass	<u>D</u> .	0.20	70_	LOW	50		Channelization Riparian Removal
Subjective Rating (1-10)	Aesthetic Rating (1-10)	Average Width	Average Depth	Maximum Depth	Av. Bankfull Ban	Measurements: kfull Mean W/D Depth Ratio	Bankfull Max Depth	Floodprone E	ntrench. Ratio	Landfills  Natural  Dams  Other Flow Alteration
Gr	adient: (1-10) Moderate,	10M	70 cm	120 cm	<u> </u>			<u> </u>		Other:□
Stream	Drawing:		,		ı				-	
+					•	Îşa. G	्रक् इ.स.च्या	·	j	-
AKK.		:						· ·		
1										
S. S. S. S. S. S. S. S. S. S. S. S. S. S				•					456	
	<		or Desa			,	٠.		NO BE	· parco
H	Low L	·				; ;.				
									Yes No	
	for Scoring the Alte be absent; 1 - Cove									Is There Water Upstream? How Far:
present in me	oderate amounts,	Evamples	nignest qua	illy or in sma	ılı antounts or nigi Finclude verv lard	e boulders in dee	p or fast water,			Is There Water Close Downstream? How Far:
logs that are	stable, well develo	oped rootw	ads in deep	o/fast water,	or deep, well-defi	ned, functional po	ools.			Is Dry Channel Mostly Natural?

er Cuppostad Courson of 1

SUBSTRATE (Check ONLY TWO Substrate TYPE BOXES: Estimate % present):   YPE   POOL RIFELS   SUBSTRATE OSIGN   SUBSTRATE QUALITY     JOB		Qualitative Habi	tat Evalua	tion Index	Field S	sheet Qr	HEI Score	<u>:</u> _
Substrate   2-74   Comments	River Code: 08-210 RM:	23,5 Stream M	F. 4177	re Bo	NEX	CR.		
SUBSTRATE (PRES)					<u> </u>			
SUBSTRATE (Check ONLY TWO Substrate TYPE BOXES: Estimate % present):   YPE   POOL RIFER   SUBSTRATE OBJECTION     DIRECTION   DIRECTION   DIRECTION   DIRECTION     DIRECTION   DIRECTION   DIRECTION   DIRECTION   DIRECTION     DIRECTION   DIRECTION   DIRECTION   DIRECTION   DIRECTION     DIRECTION   DIRECTION   DIRECTION   DIRECTION   DIRECTION     DIRECTION   DIRECTION   DIRECTION   DIRECTION   DIRECTION   DIRECTION     DIRECTION   DIRECTION   DIRECTION   DIRECTION   DIRECTION   DIRECTION     DIRECTION	Scorers Initials: DJA		LAT/LO	NG 40	53 161	80 47	25	
POOL RIFFLE   POOL RIFFLE   POOL RIFFLE SUBSTRATE CRIGIN   SUBSTRATE CRIGIN   Check ONE (OR 2 & AVERAGE) Check ONE (OR 2 & AVER					ent);			
Check ONE (OR 2 & AVERAGE)   Check ONE (OR	-					SUBSTR/	ATE QUALITY	
C-BOLLOER [9]	<del></del>	[] []-GRAVEL [7] _	Che	ck ONE (OR	Z & AVERA	GE)Check C	NE (OR 2 &	AVERAGE)
CO-DBILE [8]			O -L	IMESTONE [1]	SILT:	□-SILT I	HEAVY [-2]	•
CHARADPAN (4)						过-SILT A	ODERATE [-1]	Substrate
Chance   C	· · · · · · · · · · · · · · · · · · ·							
Carper   C		-						
OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-sources: OTE: (ignore studge originating from point-succes: OTE: (ignore studge originating from points) OTE: (ignore studge orig	O D-SILT [2]				EMBEDDE			May 20
Channel   Chan		ing from point-sources;						Max 20
UMBER OF SUBSTRATE TYPES:	score on natural substrates)							
DAMANTS		PES: (0-4 or Less [0]	. 🗖 -51	HALE [-1]				
INSTREAM COVER   See back for instructions for additional cover scoring method   AMOUNT_(Check ONLY One or TYPE: (Check All That Apply)   Check 2 and AVERAGE   Cover   Cover   Cover   Check 2 and AVERAGE   Cover	COMMENTS							
TYPE_ (Check All That Apply)		e back for instructions			method)	AMOUNT: (Ch	eck ONLY One	or _
				_				Cover
SARALLOWS (IN SLOW WATER) [1]	M UNDERCUT BANKS [1]	POOLS> 70	Cm [2] (7C	XBOWS, BACKWA	ATERS [1]	- EXTENSIV	E > 75% [11]	
SARALLOWS (IN SLOW WATER) [1]	Z OVERHANGING VEGETATI	ON [1] 🔼 1 ROOTWAD	S [1] 🛍A	QUATIC MACROP	HYTES [1]	- MODERAT	E 25-75% [7]	
CHANNEL MORPHOLOGY: (check ONLY One PER Category OR check 2 and AVERAGE)				OGS OR WOODY	DEBRIS [1]	🕱 - SPARSE 5	-25% [3]	Max 20
CHANNEL MORPHOLOGY: (check ONLY One PER Category OR check 2 and AVERAGE)	ROOTMATS [1] COMME	NTS:			<u> </u>	O - NEARLY A	\BSENT < 5%[1]	
NICH			PER Category	OR check 2 ar	nd <i>AVERA</i> (	GE)		
MODERATE [3]	SINUOSITY DEVELO	PMENT CHANNELIZA	ATTON STA	BILITY	MODIFICATI	ONS/OTHER		Channel
1.0W   2	□ - HIGH [4] □ - EXC	ELLENT [7] O-NONE [6]	<b>5</b> -	HIGH [3]	🗆 - SNAGGI	NG 🗇 -	IMPOUND.	
-NONE [1]	- MODERATE [3] KT - GOO	D [5] - RECOVE	RED[4] ⊠	MODERATE [Z]	☐ - RELOCA	TON OT	ISLANDS	
RECOVERY [1]	x(-LOW [2] 文 方子AIR	.[3] X RECOVE	RING [3] 💢 - 1	LOW [1]	T - CANOPY	removal () -	LEVEED	Max 20
DWENTS:  RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  R (Per Bank)  D - RODERATE 10-50m [3]  R AS-HRUB OR OLD FIELD [2]  D - RESIDENTIAL, PARK, NEW FIELD [1]  D - MONE [0]  OM-  BITS:  BY - NARROW 5-10 m [2]  C- VERY NARROW -5 m [1]  D - FENCED PASTURE [1]  D - HENCED PASTURE [1]  D - HENCED PASTURE [1]  C- VERY NARROW -5 m [1]  D - FENCED PASTURE [1]  D - MONE [0]  OM-  BITS:  BY - POOL WIDTH - RIFFLE WIDTH [2]  C- VERY NARROW -5 m [3]  D - POOL WIDTH - RIFFLE WIDTH [2]  C- VERY NARROW -5 m [4]  D - FENCED PASTURE [4]  D - HEAVY/SEVERE [1]  Max 10  CURRENT VELOCITY [POOLS & RIFFLES]  CURRENT VELOCIT	1 - NONE [1] 13 - POO	R [1] □ - RECENT	OR NO		ØC- DREDGI	NG-0 L> □.	BANK SHAPING	
RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)		recovery [	1]		ONE SID	DE CHANNEL MO	DDIFICATIONS	
Riparian WIDTH   FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)   BANK EROSION   Riparian   Riper Bank)   L R (Most Predominant Per Bank)   L R (Most Predominant Per Bank)   L R (Per Bank)   R (Per Bank)   L R (Per Bank)   R (Per Bank)   L R (Per Bank)   R (Per Bank)   R (Per Bank)   R (Per Bank)   R (Per Bank)   R (Per Bank)   R (Per Bank)   R (Per Bank)   R (Per Bank)   R (Per Bank)   R (Per Bank)   R (Per Bank)   R (Per Bank)   R (Per Bank)	COMMENTS:		<del></del>	: 				
R (Per Bank)								ownstream
Comparing the comparing comparing to the comparing comparing to the comparing comparing to the comparing					<u>r RIPARIAN</u>			Riparian
C	- v - ·					•	•	
CHECK ONE OR CHECK 2 AND AVERAGE  CHECK					_		WODERATE [2]	-Max 10
OM- ENTS:   POOL/GLIDE AND RIFFLE/RUN QUALITY  AAX. DEPTH  MORPHOLOGY  (Check 1 only!) (Check 1 or 2 & AVERAGE)  (Check All That Apply)  - > 1							HEAVY/SEVERE[1	1
OM- ENTS:  ]POOL/GLIDE AND RIFFLE/RUN QUALITY  AX. DEPTH		D -FENCED PASTURE [1		D-MINING/CO	NSTRUCTION	[ပ]		
ENTS:  POOL/GLIDE AND RIFFLE/RUN QUALITY   MAX. DEPTH	• • •			•			•	
Pool/GLIDE AND RIFFLE/RUN QUALITY   Pools & RIFFLES!    Pool/AAX. DEPTH   MORPHOLOGY   CURRENT VELOCITY [POOLS & RIFFLES!]   Current   Check 1 ONLY!)   (Check 1 or 2 & AVERAGE)   (Check All That Apply)   Control	COM-							
CHECK ONE OR CHECK 2 AND AVERAGE  CHECK ONE OR CHECK 2 AND AVERAGE  CHECK ONE OR CHECK 2 AND AVERAGE  CHECK ONE OR CHECK 2 AND AVERAGE  CHECK ONE OR CHECK 2 AND AVERAGE  CHECK ONE OR CHECK 2 AND AVERAGE  CHECK ONE OR CHECK 2 AND AVERAGE  FFLE DEPTH  C-Best Areas > 10 cm [2]  Best Areas > 10 cm [2]  Best Areas > 5 cm  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE/Run EMBEDDEDNESS  AVERAGE  CHECK ONE OR CHECK 2 AND AV	MENTS:	CIDADA CALALITY						<del></del>
Check 1 ONLY!) (Check 1 or 2 & AVERAGE) (Check All That Apply)  ->1m [6]				CHEDEN	· 0.615	/ (BOOLD 6	DIESE E013	
- >1m [6]			3.4 a.w.				KILLTERI	
- 0.7-Im[4]								
- 0.40.7m[2]				- '				
- 0.2-0.4m[1]  - < 0.2m [POOL=0] COMMENTS:  CHECK ONE OR CHECK 2 AND AVERAGE  FFLE DEPTH  RUN DEPTH  RIFFLE/RUN SUBSTRATE  RIFFLE/RUN EMBEDDEDNESS  - Best Areas > 10 cm [2]  - Best Areas > 10 cm [1]  - Best Areas > 5 cm  Riffle/Run  - Best Areas > 5 cm  Riffle/Run  - CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE/RUN EMBEDDEDNESS  - NONE [2]  - NONE [2]  - NONE [2]  - Max 8  - COW [1]  - Max 8  - COW [1]  - Max 8  - COW [1]  - Max 8  - COW [1]  - Moderate [0]  - Condient  - C						_	-	Max 12
CHECK ONE OR CHECK 2 AND AVERAGE  FFLE DEPTH  RUN DEPTH  RIFFLE/RUN SUBSTRATE  RIFFLE/RUN EMBEDDEDNESS  - Best Areas > 10 cm [2]  - Best Areas 5-10 cm [1]  - Best Areas < 5 cm  RIFFLE (e.g., Cobble, Boulder) [2]  - Best Areas < 5 cm  RIFFLE (e.g., Cobble, Boulder) [2]  - MAX < 50[1]  - MAX < 50[1]  - MAX < 50[1]  - MAX < 50[1]  - MODERATE [0]  - CATENSIVE [-1]  - OMMENTS:  - NO RIFFLE [Metric=0]		-POOL WIDTH < RIFFLE W.	,UJ	* .	[1] ב	-INTERMITENT	[-2]	
CHECK ONE OR CHECK 2 AND AVERAGE  Riffle/Run  Riffle/R	J - 0.2-0.4m [1]			βα"-SLOW [1]				
CHECK ONE OR CHECK 2 AND AVERAGE  RUN DEPTH RIFFLE PUN SUBSTRATE RIFFLE/RUN EMBEDDEDNESS  - Best Areas 5-10 cm [1] - Best Areas 5-10 cm [1] - Best Areas 5-5 cm RIFFLE=0] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MODERATE [0] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX < 50[1] - MAX & M	- < 0.2m [POOL=0] CO	WWEN12:		<del></del>			<del></del>	
RUN DEPTH RIFFLE/RUN SUBSTRATE RIFFLE/RUN EMBEDDEDNESS  - Best Areas > 10 cm [2]		OUEO			E5405			Riffle/Run
(-Best Areas >10 cm [2]								
- Best Areas 5-10 cm[1]								$\parallel \parallel$
- Best Areas < 5 cm								Max 8
[RIFFLE=0]  DMMENTS:  D- NO RIFFLE [Metric=0]		☐ - MAX < 50[1]				-	- •	
DMMENTS: O- NO RIFFLE [Metric=0]			O-UNSTABLE	(rine Gravel,S	ano) [0]			Gradient
May 10	<u>-</u>		¥'		10 bire = -		N217E [-1]	
CRADIENT (ft/mi): 5.21 DRAINAGE AREA (Sq.mi): 36 %POOL 72 %GLIDE:	COMMENTS:		<del></del>	P•N	NO KIFFLE [/	wetuc=0]		اليسا
COMBINE RUMB		21	3/	· + 0/ DO	OI. BA		E. F	Max 10
	ōJ GRADIENT (ft/mi): ンパ	<u>≂ T</u> DRAINAGE AREA (	عرب:(.sq.mi.					
est areas must be large enough to support a population of riffie-obligate fish species. %RIFFLE: 3 %RUN: 2	Best areas must be large engug	h to support a population of	riffie-oblicate fish	ordit species.	TLE 3	70KUN:	[7]	

Is Sampling Reach Repres	entative of the Stream (Y/N) 1 If Not, Explain:	Major Suspected Sources of Impacts (Check All That Apply): None [ Industrial of the content of t
		Ag Livestock Silviculture Construction
Subjective Aesthetic Rating Rating (1-10) Gradient: Gradient: G-Low, G-Moderate, G-High	First Sampling Pass D-20 50  Stream Measurements: Average Average Maximum Av. Bankfull Bankfull Mean W/D Bar	Urban Runoff CSOs Suburban Impacts Mining Channelization Riparian Removal Landfills Natura Depth Area Width Ratio  Urban Runoff CSOs Suburban Impacts Mining Channelization Riparian Removal Landfills Natura Dams Other Flow Alteration Other:
Stream Drawing		
MARK-S	BUTCHER &.	Marin Service Control of the Control
0 - Cover type absent; 1 - Cover present in moderate amounts,	nate Cover Metric: Each Cover Type Should Receive a Score of Betwee type present in very small amounts or if more common of marginal qualit ut not of highest quality or in small amounts of highest quality; 3 - Cover to examples of highest quality cover include very large boulders in deep or faced rootwads in deep/fast water, or deep, well-defined, functional pools.	ne of highest quality in

Qualitative Habitat Evaluation Index Field Sheet QHEI Score:
River Code: 08-200 RM: 25.8 Stream M. F. L. BEAVER CR.
Date 07/499 Location DST. END OF SWAMP
Scorers Initials: > TA Comments LAT/LONG 40 54 32/80 48 3/
1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % present);
TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE ORIGIN SUBSTRATE QUALITY
Check ONE (OR 2 & AVERAGE) Check ONE (OR 2 & AVERAGE)
D-BOULDER [9] AD-SAND [6]
O O-HARDPAN [4] O O-DETRITUS[3] - WETLANDS[0] O -SILT NORMAL [0]
MO-MUCK [2] O-ARTIFICIAL[0] O-HARDPAN [0] O-SILT FREE [1]
O -SANDSTONE [0] EMBEDDED O -EXTENSIVE [-2] Max 20
NOTE: (Ignore sludge originating from point-sources;
score on natural substrates)
NUMBER OF SUBSTRATE TYPES: 0-4 or Less [0] 0 -SHALE [-1] 0 -NONE [1]
COMMENTSD-COAL FINES [-2] 2] INSTREAM COVER (see back for instructions for additional cover scoring method) AMOUNT: (Check ONLY One or Comments)
Type: (Check All That Apply)  Cover
UNDERCUT BANKS [1] DOOLS> 70 cm [2] DOXBOWS, BACKWATERS [1] C - EXTENSIVE > 75% [11]
OVERHANGING VEGETATION [1] D L ROOTWADS [1] D AQUATIC MACROPHYTES [1] D - MODERATE 25-75% [7]
SHALLOWS (IN SLOW WATER) [1] LOGS OR WOODY DEBRIS [1] S-SPARSE 5-25% [3] Max 20
ROOTMATS [1] COMMENTS:
3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)  SINU LOSTEY DESCRIPTIONS CHANNEL (TATION STARILITY MODIFICATIONS OTHER Channel
SHOOSHI DEVELOPMENT CHARACTERITOR STADILLY MODIFICATIONS OFFICE
- HIGH [4] - EXCELLENT [7] - NONE [6] - HIGH [3] - SNAGGING - MPOUND.  - MODERATE [3] - GOOD [5] - RECOVERED [4] - MODERATE [2] - RELOCATION - ISLANDS
D LOW [2] A FAIR [3] A RECOVERING [3] D - LOW [1] D - CANOPY REMOVAL D - LEVEED Max 20
A- NONE [1] D- POOR [1] D- RECENT OR NO AC- DREDGING D- BANK SHAPING
RECOVERY [1] ( C) - ONE SIDE CHANNEL MODIFICATIONS
COMMENTS: OLD
4], RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) **River Right Looking Downstream**
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) **River Right Looking Downstream**  RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  BANK EROSION Riparian
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)   RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Per Bank) L R (Most Predominant Per Bank) L R
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Most Predominant Per Bank)  C CONSERVATION TILLAGE [1]  FOI - MODERATE 10-50m [3]  D S-SHRUB OR OLD FIELD [2]  TO CHECK 2 and AVERAGE per bank)  River Right Looking Downstream  Riparian  Riparian  Riparian  C CONSERVATION TILLAGE [1]  FOI - MODERATE [1]  RODERATE [2]
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  G
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Most Predominant Per Bank)  Riparian  Riparian  L R (Per Bank)  G-CONSERVATION TILLAGE [1]  MODERATE 10-50m [3]  B-SHRUB OR OLD FIELD [2]  Move 10
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  G-CONSERVATION TILLAGE [1]  G-NARROW 5-10 m [2]  ARROW 5-10 m [2]  ARROW 5-10 m [2]  FENCED PASTURE [1]  ARROW 5-10 m [2]  FENCED PASTURE [1]  ARROW 5-10 m [2]  FENCED PASTURE [1]  ARROW 5-10 m [2]  FENCED PASTURE [1]  ARROW 5-10 m [2]  FENCED PASTURE [1]  ARROW 5-10 m [2]  FENCED PASTURE [1]
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  G-CONSERVATION TILLAGE [1]  G-NARROW 5-10 m [2]  G-NARROW 5-10 m [2]  G-NARROW 5-10 m [2]  G-FENCED PASTURE [1]  G-HEAVY/SEVERE[1]  Max 10  COM-
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  G
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  G-CONSERVATION TILLAGE [1]  M-MODERATE 10-50m [3]  M-SHRUB OR OLD FIELD [2]  G-NARROW 5-10 m [2]  M-RESIDENTIAL, PARK, NEW FIELD [1]  G-MINING/CONSTRUCTION [0]  COM-  MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  **River Right Looking Downstream**  **R (Per Bank)  **R (P
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  G-FOREST, SWAWP [3]  G-CONSERVATION TILLAGE [1]  M-MODERATE 10-50m [3]  M-SHRUB OR OLD FIELD [2]  G-URBAN OR INDUSTRIAL [0]  MAX DEPTH  MORPHOLOGY  (Check 1 ONLY!)  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **BANK EROSION Riparian  Riparian  Riparian  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **River Right Looking Downstream**  **R(Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  Riparian  **RownNE/LITILE [3]  **GOZ NONE/LITILE [3]  **MAX DEPTH MAX 10  **GOZ NONE/LITILE [3]  **GOZ NONE/LITILE [
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  C R (Per Bank)  C R (Per Bank)  Riparian  L R (Most Predominant Per Bank)  Riparian  L R (Per Bank)  Riparian  C NONE/LITTLE [3]  Riparian  L R (Per Bank)  Riparian  C NONE/LITTLE [3]  Riparian  C NONE/LITTLE [3]  C NONE/LITTLE [3]  Riparian  C NONE/LITTLE [3]  C NONE/LITTLE [3]  Riparian  C NONE/LITTLE [3]  C NONE/LITTLE [3]  C NONE/LITTLE [3]  Riparian  C NONE/LITTLE [3]  C NONE/LITTLE [3]  Riparian  C NONE/LITTLE [3]  Riparian  C NONE/LITTLE [3]  C NONE/LITTLE [3]  Riparian  C NONE/LITTLE [3]  C NONE/LI
4], RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R (Per Bank)  L R (Most Predominant Per Bank)  C R (Per Bank)  D -FOREST, SWAWP [3]  D -FOREST, SWAWP [3]  D -FOREST, SWAWP [3]  D -CONSERVATION TILLAGE [1]  D -NARROW 5-10 m [2]  D -NARROW 5-10 m [2]  D -FENCED PASTURE [1]  D -HEAVY/SEVERE[1] Max 10  C -WET NARROW 5 m [1]  C -WET NARROW 5 m [1]  C -WET NARROW 5 m [1]  C -FOREST, SWAWP [3]  D -FENCED PASTURE [1]  C -WINING/CONSTRUCTION [0]  COM-  MENTS:  S-JPOOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  (Check 1 ONLY!)  (Check 1 on LY!)  C -POOL WIDTH > RIFFLE WIDTH [2]  C -0.7-1m [4]  C -0.4-0.7m [2]  C -POOL WIDTH < RIFFLE WIDTH [1]  C -0.4-0.7m [2]  C -NINIERSTITIAL[-1]  Max 12  Max 12
4], RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  G-FOREST, SWAWP [3]  G-FOREST, SWAWP [3]  G-CONSERVATION TILLAGE [1]  G-NARROW 5-10 m [2]  G-RESTIDENTIAL, PARK, NEW FIELD [1]  G-NARROW 5-10 m [2]  G-PENCED PASTURE [1]  G-NARROW 5-10 m [2]  G-PENCED PASTURE [1]  G-NARROW 5-10 m [2]  G-PENCED PASTURE [1]  G-P
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  G-FOREST, SWAWP [3]  G-FOREST, SWAWP [3]  G-CONSERVATION TILLAGE [1]  G-NARROW 5-10 m [2]  G-RESIDENTIAL, PARK, NEW FIELD [1]  G-NARROW 5-10 m [2]  G-POLED PASTURE [1]  G-NARROW 5-10 m [2]  G-POLED PASTURE [1]  G-NONE [0]  COM-  MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  (Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  G-0.7-1m [4]  G-0.4-0.7m [2]  G-0.2-0.4m [1]  G-0.2-0.4m [1]  G-0.2-0.4m [1]  G-0.2-0.4m [1]  G-0.2-0.4m [1]  G-0.2-0.4m [1]  G-0.2-0.4m [1]  G-0.2-0.4m [1]  G-0.2-0.2m [POOL=0]  COMMENTS:  SANK EROSION  Riparian  Riparian  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  Riparian  L R (Per Bank)  Riparian  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  Riparian  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  Riparian  L R (Per Bank)  L
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  C R (Per Bank)  L R (Most Predominant Per Bank)  C R (Per Bank)  C R (Per Bank)  Riparian  Riparia
A] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  Riparian  L R (Per Bank)  L R (
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  RIPARIAN  RIP
4]. RIPARIAN ZONE ÄND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Per Bank)  C R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  C R (Per Bank)  R
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) C G-CONSERVATION TILLAGE [1] C G-CONSERVATE [1] C
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) D - WIDE > Som [4] D - FOREST, SWAWP [3] D - CONSERVATION TILLAGE [1] D - CONSERVATION TILLAGE [1] D - WODERATE [0-50m [2] D - WODERATE
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) C G-CONSERVATION TILLAGE [1] C G-CONSERVATE [1] C
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) C - WiDE > 50m [4] C - WiDE > 50m [4] C - WIDE > 50m [4] C -
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) C - WODE > 50m [4] C - WODE > 50m [4] C - WODE > 50m [4] C - WODE PAST USE (D

Is Sampling Reach Repres	sentative of the St	` 7	If Not, Exp		ZAND		Major Suspected Sources of Impacts (Check All That Apply): None  Industrial  WWTP  Ag  Livestock  Silviculture  Construction  Urban Runoff
Subjective Aesthetic Rating (1-10) Gradient: Gradient: Gradient: Gradient: Gradient:		Gear:  Maximum And Depth  //o	v. Bankfull Ban	Water Clarity:  40  Measurements: kfull Mean W/D Depth Ratio	Low Bankfull Max I	Canopy -% Open  50  Floodprone Entrench Area Width Ratio	CSOs ☐ Suburban Impacts ☐ Mining ☐ Channelization ☒ Riparian Removal ☐ Landfills ☐
Stream Drawing			<u></u>				
THE WASHERT STE			33.57	XAXX	turan D and 3 1	Yes	ts Stream Ephemeral (No pools, totally dry or only damp spots)?
Instructions for Scoring the Alte 0 - Cover type absent; 1 - Cover present in moderate amounts, moderate or greater amounts. logs that are stable, well developed	er type present in very but not of highest qua Examples of highest	r small amounts lity or in small a quality cover inc	or it more com mounts of high clude very large	nest quality; 3 - Co boulders in deep	ver type of higher or fast water, la	est quality in	, , , , , , , , , , , , , , , , , , ,

%POOL: 40

%RiffLE:

%GLIDE:

%RUN:

5

\*Best areas must be large enough to support a population of riffle-obligate fish species

EPA 4520

61 GRADIENT (ft/mi): 374 DRAINAGE AREA (sq.mi.): 26

Is Sampling Reach Representative of the Stream (Y/N)/If Not, Explain:	Major Suspected Sources of Impacts (Check All That Apply):
ON WETLAND AREA	None () Industrial () WWTP ()
	Ag 🗍 Livestock 🗇
·	Silviculture  Construction
	Urban Runoff
Gear: Distance: Water Clarity: Water Stage: Canopy -% O	pen Suburban Impacts  Mining
First Sampling Pass D 0.20 >40 Low 70	Channelization a Riparian Removal
Subjective Average Average Maximum Av. Bankfull Bankfull Mean W/D Bankfull Max Floodorone Ent	Landfills []
Rating Rating Width Depth Depth Width Depth Ratio Depth Area Width R	Ratio Other Flow Alteration
Gradient: 10 M 60 cm 1/0 cm	Other:
Stroom Drowings	
Stream Drawing:	
13	
XXX	
THE STATE OF THE S	
	*** **
	Yes No
	is Stream Ephemeral (No pools, totally dry or only damp spots)?
Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where:  0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type	Is There Water Upstream?  How Far:
present in moderate amounts, but not of highest quality or in small amounts of highest quality or in small amounts of highest quality or in small amounts of highest quality cover include very large boulders in deep or fast water, large diameter.	Is There Water Close Downstream? How Far:
logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.	is Dry Channel Mostly Natural?

Chief A Qualitative Habitat Evaluation Index Field Sheet QHEI Score	
River Code: 08-200 RM: 32.0 Stream M.F. LITTLE BEAVEL CL.	
Date 07/399 Location (/DST, SR 45	
Scorers Initials: DJA Comments LAT/LONG: 70 58 06/80 51 25  1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % present);	
TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE ORIGIN SUBSTRATE QUALITY	•
Check ONE (OR 2 & AVERAGE)Check ONE (OR 2 & AVERAGE)Check ONE (OR 2 &	AVERAGE)
OD-BOULDER [9] ZO-SAND [6] D-LIMESTONE [1] SILT: O-SILT HEAVY [-2]	· (, _, _, , _, ,
OO-COBBLE [8] OO-BEDROCK[5] STILLS [1] A-SILT MODERATE [-1]	Substrate
G-HARDPAN [4] G-DETRITUS[3] G-WETLANDS[0] G-SILT NORMAL [0]	
O D-MUCK [2] O D-ARTIFICIAL[0] O HARDPAN [0] O SILT FREE [1]	
□ □-SILT [2] □ -SANDSTONE [0] EMBEDDED □ -EXTENSIVE [-2]	Max 20
NOTE: (Ignore sludge originating from point-sources:	Max 20
score on natural substrates) 2-5 or More [2]	
NUMBER OF SUBSTRATE TYPES: []-4 or Less [0] []-SHALE [-1] []-NONE [1]	
COMMENTS D-COAL FINES [-2]	
2] INSTREAM COVER (see back for instructions for additional cover scoring method) AMOUNT: (Check ONLY One	or Cover
TYPE: (Check All That Apply) check 2 and AVERAGE)	Cover
UNDERCUT BANKS [1] D_POOLS> 70 cm [2] D_OXBOWS, BACKWATERS [1] D_EXTENSIVE > 75% [11]	
M / OVERHANGING VEGETATION [1] M / ROOTWADS [1] AQUATIC MACROPHYTES [1] S-MODERATE 25-75% [7]	اليسا
Z SHALLOWS (IN SLOW WATER) [1] A L BOULDERS [1] Z LOGS OR WOODY DEBRIS [1] Z SPARSE 5-25% [3]	Max 20
□ ROOTMATS [1] COMMENTS:	j
3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)	
SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER	Channel
O-HIGH [4] O-EXCELLENT [7] X-NONE [6] O-HIGH [3] O-SNAGGING O-MPOUND.	
MODERATE [3] A-GOOD [5] - RECOVERED [4] - MODERATE [2] - RELOCATION - ISLANDS	[كيا]
D-LOW [2] X - FAIR [3] D - RECOVERING [3] D LOW [1] X - CANOPY REMOVAL D - LEVEED	Max 20
☐ - NONE [1] ☐ - POOR [1] ☐ - RECENT OR NO	ı
RECOVERY [1] O - ONE SIDE CHANNEL MODIFICATIONS	
COMMENTS:	
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ** River Right Looking I	⊃ownstream <b>≭</b>
RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM) BANK EROSION	Riparian
L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank)	
O O G-CONSERVATION TILLAGE [1] A O NONE/LITTLE [3]	
MODERATE 10-50m [3]	1 Max 10
NARROW 5-10 m [2] A CI-RESIDENTIAL, PARK, NEW FIELD [1] CI 21-OPEN PASTURE; ROWCROP [0] CI 25 HEAVY/SEVERE	i)
O O - VERY NARROW <5 m[1] O O - FENCED PASTURE [1] O O - MINING/CONSTRUCTION [0]	
□ 3X - NONE [0]	
CDM-	
MENTS:	
5.]POOL/GLIDE AND RIFFLE/RUN QUALITY	Pool/
MAX. DEPTH MORPHOLOGY CURRENT VELOCITY [POOLS & RIFFLES!]	Current
(Check 1 ONLY!) (Check 1 or 2 & AVERAGE) (Check All That Apply)	
□ - >1m [6] ☑ -POOL WIDTH > RIFFLE WIDTH [2] □ -EDDIES[1] □ -TORRENTIAL[-1]	
O-POOL WIDTH = RIFFLE WIDTH [1] DX-FAST[1] D-INTERSTITIAL[-1]	Max 12
Ø- 0.4-0.7m [Z] □ -POOL WIDTH< RIFFLE W. [0] Ø: -WODERATE [1] □ -INTERWITTENT[-Z]	
O - < 0.2m [POOL=0] COMMENTS:	
OUTCV ONE OD OUTCV 2 AND AVEDACE	Riffle/Run
CHECK ONE OR CHECK 2 AND AVERAGE  RIN DEPTH RIFFLE/RUN SUBSTRATE RIFFLE/RUN EMBEDDEDNESS	(तिहास)
MITTE DEFIN	
M-Best Areas >10 cm [2]	<u> </u>

O - LOW [1]

A - MODERATE [0]

- EXTENSIVE [-1] | MOD. STABLE (e.g., Large Gravel) [1]
| □-UNSTABLE (Fine Gravel, Sand) [0] Max 8 X - MAX < 50[1] ☐ - Best Areas 5-10 cm[1] Gradient ☐ - Best Areas < 5 cm [RIFFLE=0] NO RIFFLE [Metric=0] COMMENTS:\_ Max 10 6] GRADIENT (ft/mi): 6.25 DRAINAGE AREA (sq.mi.): 18.9 %POOL: 50 %GLIDE: ZO %RIFFLE: ZO %RUN: 10 \*Best areas must be large enough to support a population of riffle-obligate fish species. 7/16/98 EPA 4520

Is Sampling Reach Representative of the Stream (Y/N) / If Not, Explain:	Major Suspected Sources of Impacts (Check All That Apply):  None  Industrial
	WWTP &
	Livestock ☐ Silviculture ☐
	Construction () Urban Runoff ()
Gear: Distance: Water Clarity: Water Stage: Canopy -% Open	CSOs ☐ Suburban Impacts ☐ Mining ☐
First Sampling Pass D 0.20 Km >60 cow 60	Channelization  Riparian Removal
Stream Measurements: Subjective Aesthetic Average Average Maximum Av. Bankfull Bankfull Mean W/D Bankfull Max Floodprone Entrench. Rating Rating Width Depth Depth Width Depth Ratio Depth Area Width Ratio  (1-10) (1-10)	Landfills ☐ Natural ☐ Dams ☐
Gradient: ' 19/40 ! 470 ! 60 ! !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!	Other Flow Alteration  Other:
☐ - Low, ☐ - Moderate, ☐ -High [ / / / / / / / / / / / / / / / / / /	
Stream Drawing:	
	Is Stream Ephemeral (No pools, totally dry or only damp spots)?  Is There Water Upstream? How Far: Is There Water Close Downstream? How Far: Is Dry Channel Mostly Natural?

Qualitative Habitat Evaluation Index Field Sheet QHEI Score:	
River Code: 08-200 RM: 33.3 Stream M. F. LITTLE BEAVER CR.	_
Date 07/399 Location MIDDLETOWN RD, - UPST,	_
Scorers Initials: DJA Comments 47/LONG 40 57 30/80 51 52	_
1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % present);	
TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE ORIGIN SUBSTRATE QUALITY	
Check ONE (OR 2 & AVERAGE)Check ONE (OR 2 & AVERAGE)Check ONE (OR 2 & AVERAGE)	AGE)
D BOULDER [9] O-SAND [6] D-SILT HEAVY [-2]	
O-COBBLE [8] O-BEDROCK[5] ATILLS [1] Subs	
O O-HARDPAN [4] O-DETRITUS[3] WETLANDS[0] O-SILT NORMAL [0]	
O O-MUCK [2] O O-ARTIFICIAL[0] O -HARDPAN [0] SILT FREE [1]	
D D-SILT [2] SANDSTONE [0] EMBEDDED D-EXTENSIVE [-2] Ma	x 20
NOTE: (Ignore sludge originating from point-sources;	
score on natural substrates)	<i>2</i> "
NUMBER OF SUBSTRATE TYPES: 0-4 or Less [0] . 0-SHALE [1]	
COMMENTS	-
2] INSTREAM COVER (see back for instructions for additional cover scoring method) AMOUNT: (Check ONLY One or Co	ver
TYPE: (Check All That Appty)	
M _UNDERCUT BANKS [1] M _ POOLS> 70 cm [2] M _LOXBOWS, BACKWATERS [1] [1] EXTENSIVE > 75% [11]	* 11
OVERHANGING VEGETATION [1] ACQUATIC MACROPHYTES [1] M MODERATE 25-75% [7]	) )
SHALLOWS (IN SLOW WATER) [1] D BOULDERS [1] D SPARSE 5-25% [3] May	. 20
A COMMENTS: COMM	
3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) SINLOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER Chan	nnel
SINUSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER	<u></u>
- HIGH [4]	8-II
A double	ريت
	x 20
The state of the s	
COMMENTS:  Al DIDA DIAN ZONE TAID BANK EDOSION (about ONE box por book or chark 2 and AVEDACE per bank). ** Biyer Bight Looking Downs	stream <del>*</del>
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) **River Right Looking Downs	
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ** River Right Looking Downs RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  BANK EROSION Ripa Ripa	
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)   RIPARIAN WIDTH   FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)   BANK EROSION   Ripa L R (Per Bank)   L R (Per Bank)	
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downs RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  D CF-CONSERVATION TILLAGE [1]  Ripa  L R (Per Bank)	
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) ★ River Right Looking Downs RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) L R (West Predominant Per Bank) L R (Per Bank) L R (Per Bank)  A WOSENTE 10-50m [3]  A WOSENTE 10-50m [3]  A WOSENTE 10-50m [3]  A WOSENTE 10-50m [3]  A WOSENTE 10-50m [3]  A WOSENTE 10-50m [3]  A WOSENTE 10-50m [3]  A WOSENTE 10-50m [3]  A WOSENTE 10-50m [3]  A WOSENTE 10-50m [3]	urian
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)	urian
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)	urian
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)	urian
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Wost Predominant Per Bank)  L R (Wost Predominant Per Bank)  L R (Per Bank)  J R (Per Bank)  Ripa  L R (Per Bank)  L R (Per Bank)  J R (Per B	urian
4], RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)	rian : 10
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Wost Predominant Per Bank)  L R (Wost Predominant Per Bank)  L R (Per Bank)  D G-CONSERVATION TILLAGE [1]  DMODERATE 10-50m [3]  D G-SHRUB OR OLD FIELD [2]  D G-NARROW 5-10 m [2]  D G-RESIDENTIAL, PARK, NEW FIELD [1]  D G-MINING/CONSTRUCTION [0]  COM-MENTS:  S. [POOL/GLIDE AND RIFFLE/RUN QUALITY]  Pool	i 10
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Wost Predominant Per Bank)  L R (Wost Predominant Per Bank)  L R (Per Bank)  A POREST, SWAWP [3]  CI-CONSERVATION TILLAGE [1]  A PONDERATE 10-50m [3]  CI-SHRUB OR OLD FIELD [2]  CI-URBAN OR INDUSTRIAL [0]  CI-WENT NARROW 5-10 m [2]  CI-WENT NARROW 5-10 m [2]  CI-WENT NARROW 5-10 m [2]  CI-WENT NARROW 5-10 m [2]  CI-WENT NARROW 5-10 m [2]  CI-WENT NARROW 5-10 m [2]  CI-WENT NARROW 5-10 m [2]  CI-WENT NARROW 5-10 m [2]  COM-WENTS:  SIPOOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  CURRENT VELOCITY LPOOLS & RIFFLESI]  Current VELOCITY LPOOLS & RIFFLESI]	i 10
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (West Predominant Per Bank)  L R (West Predominant Per Bank)  L R (West Predominant Per Bank)  L R (Per Bank)  Ripa  L R (Per Bank)  Ripa  L R (Per Bank)  Ripa  C - CONSERVATION TILLAGE [1]  C - MODERATE 10-50m [3]  C - SHRUB OR OLD FIELD [2]  C - WEST NARROW 5-10 m [2]  C - WEST NARROW 5-10 m [2]  C - RESIDENTIAL PARK, NEW FIELD [1]  C - FENCED PASTURE [1]  C - WINNEG/CONSTRUCTION [0]  COM-  MENTS:  S   POOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  (Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  (Check All That Apply)	i 10
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)	arian 10 10 10
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (West Predominant Per Bank)  L R (West Predominant Per Bank)  L R (Per Bank)  Ripa  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  Ripa  Mozeracie (I)  D - MODERATE [2]  D - MODERATE [2]  D - MODERATE [2]  D - HEAVY/SEVERE[1]  Max  Pool - Month (I)  Ripa	arian 10 10 10
4]. RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank)	arian 10 10 10
4], RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  D G-FOREST, SWAWP [3]  G-CONSERVATION TILLAGE [1]  D-WODERATE 10-50m [3]  G-RESIDENTIAL PARK, NEW FIELD [1]  C-RESIDENTIAL PARK, NEW FIELD [1]  C-HEAVY/SEVERE[1]  Max  C-RESIDENTIAL [1]  POOL S & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & R	arian 10 01/ rent
4], RIPARIAN ZONE ÄND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank)	ol/ rent
4], RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  L R (Per Bank)  D G-FOREST, SWAWP [3]  G-CONSERVATION TILLAGE [1]  D-WODERATE 10-50m [3]  G-RESIDENTIAL PARK, NEW FIELD [1]  C-RESIDENTIAL PARK, NEW FIELD [1]  C-HEAVY/SEVERE[1]  Max  C-RESIDENTIAL [1]  POOL S & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & RIFFLESI]  Current VELOCITY [POOLS & R	ol/ rent
4], RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)	ol/ rent
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)	rian 10 ol/rent 12
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)	ool/ rent 12
4]. RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank) #RIVER Right Looking Downs RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L. R. (Per Bank) L. R. (Most Predominant Per Bank) L. R. (Per	ool/ rent 12
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Per Bank)  L R (Wost Predominant Per Bank)  L R (Per Bank)  D - CONSERVATION TILLAGE [1]  D - MODERATE 10-50m [3]  D - SOM [4]  D - SOM [4]  D - SOM [5]  D - SOM [6]  D - SOM [7]  D - SHRUB OR OLD FIELD [2]  D - VERY NARROW 5-10m [2]  D - FENCED PASTURE [1]  D - VERY NARROW 5-10m [2]  D - FENCED PASTURE [1]  D - SIDE STILLE (D)  MAX. DEPTH  MORPHOLOGY  (Check 1 ONLY!)  (Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  (Check All That Apply)  MAX. DEPTH  MORPHOLOGY  (Check All That Apply)  D - SOL WIDTH - RIFFLE WIDTH [1]  D - 40-7/m [2]  D - POOL WIDTH - RIFFLE WIDTH [1]  POOL WIDTH - RIFFLE WIDTH [1]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE DEPTH  RIFFLE DEPTH  RIFFLE PRONE (2)  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  B - MODERATE [1]  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  B - MODERATE [1]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  B - MODERATE [1]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  B - MODERATE [1]  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  B - MODERATE [1]  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  B - MODERATE [1]  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  B - MODERATE [1]  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRONE [2]  RIFFLE PRONE [2]  RIFFLE PRONE [2]  RIFFLE PRONE [	rian 10 10 10 10 10 10 10 10 10 10 10 10 10
4] RIPARIAN ZONE ÄND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  J M -FOREST, SWAWP [3]  O-SHRUB OR OLD FIELD [2]  O-HARROW 5-10 m [2]  O-HESIDENTIAL PARK, NEW FIELD [1]  O-HOPERATE 10-50m [3]  O-FENCED PASTURE [1]  O-HEAWY/SEVERE [1]  MAX  DEPTH  MORPHOLOGY  (Check 1 or 2 & AVERAGE)  (Check 1 ONLY!)  (Check 1 or 2 & AVERAGE)  (Check All That Apply)  AND POOL WIDTH - RIFFLE WIDTH [2]  O-40.7 m [4]  O-900L WIDTH - RIFFLE WIDTH [1]  AND POOL WIDTH - RIFFLE WIDTH [1]  O-0.2 O.4 m [1]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE DEPTH  RIFFLE DEPTH  RIFFLE PRUN STABLE (e.g., Cobbie, Boulder)  RIFFLE PRUN [1]  RAX - 50 [1]  MAX  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRUN EMBEDDEDNESS  RIFFLE PRUN [1]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRUN EMBEDDEDNESS  RIFFLE PRUN [1]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRUN [1]  CHECK ONE OR CHECK 2 AND AVERAGE  RIFFLE PRUN EMBEDDEDNESS  RIFFLE PRUN EMBEDD	rian 10 10 10 12 12 12 18
4]. RIPARIAN ZONE ÄND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank)  #River Right Looking Downs RIPARIAN WIDTH	oi/ rent 2/Run 8 dient
4] RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank)	oi/ rent 2/Run 8 dient
4] RIPARIAN ZONE ÄND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank)	oi/ rent 2/Run 8 dient

Is Sampling Reach Repre	First Sampling Pass	Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% O		Major Suspected Sources of pacts (Check All That Apply):  None
Subjective Aesthetic Rating Rating (1-10) Gradient: (1-10)  - Low, - Moderate, - High	Average Average Width Depti	ge Maximum Depth	Stream Av. Bankfull Ban Width	Measurements: okfull Mean W/D Depth Ratio	Bankfull Max Depth	Floodprone Ent	trench Ratio	Landfills ☐ Natural ☐ Dams ☐ Other Flow Alteration ☐ Other: ☐
Instructions for Scoring the Alt 0 - Cover type absent; 1 - Cov present in moderate amounts, moderate or greater amounts. logs that are stable, well devel	ernate Cover Metric: er type present in ver but not of highest que	y small amoun ality or in small Louality cover i	ts or it more com amounts of high nclude very large	imon of marginal q lest quality; 3 - Co e boulders in deep	ver type of high or fast water, i	nest quality in	Yes No	is Stream Ephemeral (No poots, totally dry or only damp shots)?  Is There Water Upstream? How Far: How Far: How Far:

!	•
Onalitative Habitat Evaluation	Index Field Sheet QHEI Score:
Qualitative Habitat Evaluation	Titldex Field Officer Writer Coole.
River Code: 08-200 RM: 36.7 Stream M.F. LITTLE	BEAVER CR.
Date 07/399 Location WAST.   DST. PINE LAKE	
	16: 40 55 06/80 53 07
1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate	% present:
TYPE POOL RIFFLE POOL RIFFLE SUBSTR	
	ONE (OR 2 & AVERAGE)Check ONE (OR 2 & AVERAGE)
	TONE [1] SILT:
D D-COBBLE [8] ZZZ D D-BEDROCK[5] X-TILLS [	
O D-HARDPAN [4] O D-DETRITUS[3] O -WETL	
O-ARTIFICIAL[0] O-HARDI	
DD-SILT [2] D -SANDS	TONE IN EMBEDDED W.EYTENCIVE (-2)
	AP [0] RESS: D-MODERATE [-1]
score on natural substrates)  \(\mathbb{g} \cdot \text{5 or More} \[ [2] \]  \(\mathbb{G} \cdot \text{LACUS} \)	• • •
NUMBER OF SUBSTRATE TYPES: 0-4 or Less [0]	용이 이번 제휴 : Transaction :
COMMENTS D-COAL F	- 1-7 (min - 1-7)
2] INSTREAM COVER (see back for instructions for additional cover	
TYPE: (Check All That Apply)	check 2 and AVERAGE)
and the second s	
	IC MACROPHYTES [1] - MODERATE 25-75% [7]
	DR WOODY DEBRIS [1] SPARSE 5-25% [3] Max 20
7 Marie 2000 1900 1900 1900 1900 1900 1900 1900	□ - NEARLY ABSENT < 5%[1]
☑ROOTMATS [1] COMMENTS:  3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR of the Control of	and the second s
	HODII ICATIOIO/ STILL
O-HIGH	4 (
M - MODERATE [3] ☐ - GOOD [5] ☐ - RECOVERED [4] M - MODE	MA CANODA BENOVAL OF TENEED
✓-LOW[2] ✓-FAIR [3] ☐-RECOVERING [3] XI-LOW	1] Max 20  Dredging Bank Shaping
- NONE [1] - POOR [1] - RECENT OR NO	O - ONE SIDE CHANNEL MODIFICATIONS
RECOVERY [1]	
COWNENTS:	SOME A 40 M
4], RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check	; 2 and AVERAGE per cank) ** Iniver hight Looking Downstream
RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST	Tipaiai
L. R (Per Bank) L. R (Most Predominant Per Bank) L. R.	L R (Per Bank)
	ONSERVATION TILLAGE [1] AT DO NONE/LITTLE [3]
	URBAN OR INDUSTRIAL [0] O G HEAVY ESTERED Max 10
	UPEN PASTURE, RUWLRUP [U] U U - TEAV 1/3EVERE[1]
Section and the section of the secti	WINING/CONSTRUCTION [0]
□ □ - NONE [0]	
COM-	•
MENTS:	
5.]POOL/GLIDE AND RIFFLE/RUN QUALITY	Pool/
MAX. DEPTH MORPHOLOGY	CURRENT VELOCITY [POOLS & RIFFLES!] Current
(Check 1 ONLY!) (Check 1 or 2 & AVERAGE)	(Check All That Apply)
D - >1m [6] A -POOL WIDTH > RIFFLE WIDTH [2]	EDDIES[1]   -TORRENTIAL[-1]
	FAST[1] Max 12
☐ - 0.4-0.7m [2] ☐ -POOL WIDTH < RIFFLE W. [0]	MODERATE [1] 🐎 🗗 -INTERMITTENT[-2]
	[1] WO.P
· · · · · · · · · · · · · · · · · · ·	

☐ - < 0.2m [POOL±0] COMMENTS: Riffle/Run CHECK ONE OR CHECK 2 AND AVERAGE RIFFLE/RUN SUBSTRATE RIFFLE/RUN EMBEDDEDNESS **RUN DEPTH** RIFFLE DEPTH RIFFLE/RUN SUDSTRALE

PSTABLE (e.g., Cobble; Boulder) [2]

PAMOD. STABLE (e.g., Large Gravel) [1] D NONE [2]
D-LOW [1]
D-MODERATE [0]
AT EXTENSIVE [-1] -\*Best Areas >10 cm [2] ☐ - MAX > 50 [2] Ø - Best Areas 5-10 cm[1]
☐ - Best Areas < 5 cm ▼ - MAX < 50[1] D-UNSTABLE (Fine Gravel, Sand) [0] Gradient [RIFFLE=0] O - NO RIFFLE [Metric=0] COMMENTS:\_ 6] GRADIENT (ft/mi): 13.89 DRAINAGE AREA (sq.mi.): 8.3 %POOL: 35 %GLIDE: 20 %RIFFLE: %RUN: \*Best areas must be large enough to support a population of riffle-obligate fish species.

Is Sampling Reach Repre	sentative of the S		/		WHGINS		Major Suspected Sources of Impacts (Check All That Apply): None [7] Industrial [7] WWTP-20
P4-1						· —	Ag [] Livestock [] Silviculture [] Construction []
		Gear:	Distance:	Water Clarity:	Water Stage:	Canopy -% Ope	Urban Runoff
	First Sampling Pass	Seal.		> 75	LOW_		Mining ☐ Channelization ☐ Riparian Removal ☐
Subjective Aesthetic Rating Rating (1-10)	Average Averag Width Depth	e Maximum Depth	Av. Bankfuli Ban	Measurements: kfull Mean W/D Depth Ratio	Bankfull Max Depth	Floodprone Entre	tio Other Flow Alteration
Gradient: (1-10) ☐ - Low, ☐ - Moderate, ☐ -Hig	1 7M 30c	1 75cm				<u> </u>	Other: MIREX XI
Stream Drawing				Bon-upst	4.7 7. 2.7		
			A A A	PINE LAKE			Control of the second of the s
				کـر			Yes No  Is Stream Ephemeral (No pools, totally dry or only damp spots)?
Instructions for Scoring the Alt 0 - Cover type absent; 1 - Cov present in moderate amounts, moderate or greater amounts, logs that are stable, well deve	but not of highest qu	ality or in small	amounts of high	hest quality; 3 - Co e boulders in deer	over type of high o or fast water,	hest quality in	Is There Water Upstream? How Far: Is There Water Close Downstream? How Far: Is Dry Channel Mostly Natural?

Qualitative Habitat Evaluation Index Field Sheet QHEI Score	<u>:                                    </u>
River Code: 08-200 RM: 37.7 Stream M.F. LITTLE BEAVER CR.	<del></del>
Date 07/299 Location UPST, ALLEN RD,	
Scorers Initials: DJA Comments SEWAGE ODOR SEWAGE SCUDGE	
1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % present);	
TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE ORIGIN SUBSTRATE QUALITY	
Check ONE (OR 2 & AVERAGE)Check ONE (OR 2 &	AVERAGE)
O D-BOULDER [9] SAND [6] O -LIMESTONE [1] SILT: SILT HEAVY [-2]	Substrata
□□-COBBLE [8]  □□-BEDROCK[5]  □  □□-BEDROCK[5]  □  □□-SILT MODERATE [-1]	Substrate
OMUCK [2] OARTIFICIAL[0] OHARDPAN [0] OSILT FREE [1] OSILT [2] OSILT [2]	ليبيا
NOTE: (Ignore sludge originating from point-sources;	Max 20
score on natural substrates)	
NUMBER OF SUBSTRATE TYPES: (7-4 or less [0] (7-SHALE [-1] (7-NONE [1]	
COMMENTS LOTT OF SLUDGE IN MARGINS 17-COAL FINES [-2]	
2] INSTREAM COVER (see back for instructions for additional cover scoring method) AMOUNT: (Check ONLY One	or C
1YPE: (Check Air That Apply) Check 2 and AVERAGE)	Cover
Ø 2 UNDERCUT BANKS [1] Ø 2 POOLS> 70 cm [2] □ OXBOWS, BACKWATERS [1] □ - EXTENSIVE > 75% [11]	
DEOVERHANGING VEGETATION [1]	السيا
SHALLOWS (IN SLOW WATER) [1] A L BOULDERS [1] LOGS OR WOODY DEBRIS [1] F SPARSE 5-25% [3]	Max 20
ZROOTMATS [1] COMMENTS: O- NEARLY ABSENT < 5%[1]	l
3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER	Channel
SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER	
DE-MODERATE [3] DE-GOOD [5] DE-RECOVERED [4] DE-MODERATE [2] DI-RELOCATION DI-ISLANDS	
Z-LOW[2] Z-FAIR [3] D-RECOVERING [3] Z-LOW[1] D-CANOPY REMOVAL D-LEVEED	Max 20
D - NONE [1] D - POOR [1] D - RECENT OR NO D - DREDGING D - BANK SHAPING	
RECOVERY [1] O - ONE SIDE CHANNEL MODIFICATIONS	
COMMENTS: LOWER 1/2 OF ZONE HAS THE LOOK OF OLD CHANNELIZATION WITH	
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) **River Right Looking D	
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) **River Right Looking E RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) BANK EROSION	Downstream 🛨
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank) **River Right Looking E RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) BANK EROSION  L R (Per Bank) L R (Most Predomínant Per Bank) L R	
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN)  R (Per Bank)  R (Wost Predominant Per Bank)  R (Wost Predominant Per Bank)  R (Per Bank)  R (Per Bank)	Downstream 🛨
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  D D -VNDE > 50m [4]  D D -SHRUB OR OLD FIELD [2]  D D -URBAN OR INDUSTRIAL [0]  *River Right Looking I BANK EROSION  L R (Per Bank)  L R (Per Bank)  D D -CONSERVATION TILLAGE [1]  D D -URBAN OR INDUSTRIAL [0]	Downstream★ Riparian
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  C C-CONSERVATION TILLAGE [1]  D C-NODERATE 10-50m [3]  C C-NODERATE 10-50m [3]  RIPARIAN ZONE AND BANK EROSION  L R (Per Bank)  L R (Per Bank)  C C-NONE/LITTLE [3]  D C-NODERATE [2]  D C-NORROW 5-10 m [2]  RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  BANK EROSION  L R (Per Bank)  C C-NONE/LITTLE [3]  D C-NODERATE [2]	Downstream★ Riparian
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D -FOREST, SWAMP [3]  D -FOREST, SWAMP [3]  D -CONSERVATION TILLAGE [1]  D -URBAN OR INDUSTRIAL [0]  D -MODERATE 10-50m [2]  D -HEAVY/SEVERE[1]  D -MINING/CONSTRUCTION [0]	Riparian  Riparian  Max 10
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  D D-FOREST, SWAMP [3]  D D-FOREST, SWAMP [3]  D D-CONSERVATION TILLAGE [1]  D D-WDDE > 50m [4]  D D-SHRUB OR OLD FIELD [2]  D D-WBAN OR INDUSTRIAL [0]  D D-MODERATE [2]  D D-MODERATE [2]  D D-MINING/CONSTRUCTION [0]	Downstream★ Riparian
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  D-FOREST, SWAMP [3]  D-FOREST, SWAMP [3]  D-SHRUB OR OLD FIELD [2]  D-VRBAN OR INDUSTRIAL [0]  D-MODERATE 10-50m [2]  D-HEAVY/SEVERE[1]  D-MINING/CONSTRUCTION [0]	Riparian  Riparian  Max 10
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  DFOREST, SWAMP [3]  DCONSERVATION TILLAGE [1]  DWIDE > 50m [4]  DSHRUB OR OLD FIELD [2]  DWIDEN ARROW 5-10 m [2]  DFENCED PASTURE [1]  DMINING/CONSTRUCTION [0]  C OM-  MENTS:	Riparian  Riparian  Max 10
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  D-FOREST, SWAMP [3]  D-FOREST, SWAMP [3]  D-CONSERVATION TILLAGE [1]  D-URBAN OR INDUSTRIAL [0]  D-NARROW 5-10 m [2]  D-FENCED PASTURE [1]  D-MINING/CONSTRUCTION [0]  COM-  MENTS:  5.]POOL/GLIDE AND RIFFLE/RUN QUALITY	Riparian Riparian Max 10 Pool/
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)	Riparian Riparian Pool/Current
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R (Per Bank)  L R (Wost Predominant Per Bank)  L R (Wost Predominant Per Bank)  L R (Wost Predominant Per Bank)  D	Riparian Riparian Max 10 Pool/
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R (Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  D	Riparian Riparian Pool/Current
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R (Per Bank)  R (Per Bank)  R (Per Bank)  R (Per Bank)  R (Wost Predominant Per Bank)  R (Per	Riparian Riparian Pool/Current
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R (Per Bank)  L R (Wost Predominant Per Bank)  L R (Wost Predominant Per Bank)  L R (Wost Predominant Per Bank)  D	Riparian Riparian Pool/Current
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R (Per Bank)  L R (Wost Predominant Per Bank)  L R (Wost Predominant Per Bank)  L R (Wost Predominant Per Bank)  L R (Per Bank)	Riparian Riparian Pool/Current
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  D-FOREST, SWAMP [3]  D-CONSERVATION TILLAGE [1]  M-NONE/UTTLE [3]  M-NONE/UTTLE	Riparian Riparian Pool/ Current Max 12
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank) or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R (Per Bank)  R (Per Bank)  R (Per Bank)  R (Most Predominant Per Bank)  R (Per Bank)  R (Per Bank)  R (Most Predominant Per Bank)  R (Per Bank)	Riparian Riparian Pool/Current
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank) or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  C R (Most Predominant Per Bank)  C R (Per Bank)	Riparian Riparian Pool/ Current Max 12
4] RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  L R (Per Bank)  L R (Most Predominant Per Bank)  C CONSERVATION TILLAGE [1]  MOST PROBEST, SWAWP [3]  C -FOREST, WAWP [3]  C -FOREST S	Riparian  Riparian  Pool/ Current  Max 12  Riffle/Run
4] RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R (Per Bank)  R (Per Bank)  R (Rost Predominant Per parian  Riparian  Pool/ Current  Max 12  Riffle/Run  Max 8	
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R	Riparian  Riparian  Pool/ Current  Max 12  Riffle/Run
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R	Riparian  Riparian  Pool/ Current  Max 12  Riffle/Run  Max 8
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  R	Riparian  Riparian  Pool/ Current  Max 12  Riffle/Run  Max 8  Gradient
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  ELOOD PLAIN QUALITY (PAST 100 Meter RIPARIAM)  L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  D -FOREST, SWAMP [3]  D -F	Riparian  Riparian  Pool/ Current  Max 12  Riffle/Run  Max 8
4]. RIPARIAN ZONE AND BANK EROSION-(check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN QUALITY (PAST 100 Meter RIPARIAN)  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN QUALITY (PAST 100 Meter RIPARIAN)  RANK EROSION  RANK EROSION  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN QUALITY (PAST 100 Meter RIPARIAN)  RANK EROSION  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN WIDTH  RIPARIAN QUALITY  MAX. DEPTH  MORPHOLOGY  COM-MENTS:  S.IPOOL/GLIDE AND RIFFLE/RUN QUALITY  MAX. DEPTH  MORPHOLOGY  CORPORATE (1)  RIPARIAN QUALITY  MORPHOLOGY  CORPORATION (I)  CORP	Riparian  Riparian  Pool/ Current  Max 12  Riffle/Run  Max 8  Gradient

Is Sampling Reach Representative of the Stream (Y/N) Y If Not, Explain:	Major Suspected Sources of Impacts (Check All That Apply):
HEAVY SILT/SAND DEDLOAD IN STREAM - DIT. FROM RELENT	None ☐ Industrial ☐
CHANNEL WORK UPST. FROM SALGE WINTY.	WWTP Ag Cl
SOWAGE OVOR IN STREAM + SLUDGE DEPOSITS	Livestock ☐ Silviculture ☐
ALONG STREAM MARGINS,	Construction  Urban Runoff
Gear: Distance: Water Clarity: Water Stage: Canopy -% Open First	CSOs ☐ Suburban Impacts ☐ Mining ☐ Channelization ☒
Sampling Pass D 6.20 KM 40 cm Low 15	Riparian Removal D
Stream Measurements: Subjective Aesthetic Average Average Maximum Av. Bankfull Bankfull Mean W/D Bankfull Max Floodprone Entrench Rating Rating Width Depth Depth Width Depth Ratio Depth Area Width Ratio (1-10)	Natural ☐ Dams ☐ Other Flow Alteration ☐
Gradient: Gradient: 6 M 25 cm 100 cm	Other:
Stream Drawing:	
Access to the second of the se	No.
	Is Stream Ephemeral (No pools, totally dry or only damp spots)?
Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where:	Is There Water Upstream? How Far:
0 - Cover type absent; 1 - Cover type present in very small amounts of it more common of marginal quality, 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter.	Is There Water Close Downstream? How Far:
logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.	Is Dry Channel Mostly Natural?

Qualitative Habitat Evaluation Index Field Sheet QHEI Score: BENVER River Code: 08-200 RM: 36.2 Stream Date 07/299 Location UPST. UJUIT ZJA Comments Scorers Initials: 40 54 CAT [43NC 1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % present); POOL RIFFLE SUBSTRATE ORIGIN POOL RIFFLE TYPE SUBSTRATE QUALITY T-BLOR /SLBS[10] X (7) \_Check ONE (OR 2 & AVERAGE)Check ONE (OR 2 & AVERAGE) **)** □-SAND [6] O -LIMESTONE [1] SILT: -SILT HEAVY [-2] O-BOULDER [9] X -SILT MODERATE [-1] Substrate O O-COBBLE [8] D D-BEDROCK[5] 区·TILLS [1] □ □-HARDPAN [4] 👤 C) CI-DETRITUS[3] -WETLANDS[0] 赵·SILT NORMAL [0] ☐ ☐-ARTIFICIAL[0] O -SILT FREE [1] □ □-MUCK [2] G -HARDPAN [0] -SANDSTONE [0] EMBEDDED TEXTENSIVE [-2] O O-SILT [2] -MODERATE [-1] NOTE: (Ignore sludge originating from point-sources; O -RIP/RAP [0] score on natural substrates) X-5 or More [2] **D** -LACUSTRINE [0] -NORMAL [0] ☐-NONE [1] NUMBER OF SUBSTRATE TYPES: A or Less [0] O -SHALE [-1] C-COAL FINES [-2] COMMENTS AMOUNT: (Check ONLY One or Cover 2] INSTREAM COVER (see back for instructions for additional cover scoring method) TYPE: (Check All That Apply) check 2 and AVERAGE) UNDERCUT BANKS [1] D POOLS> 70 cm [2] D OXBOWS, BACKWATERS [1]

OVERHANGING VEGETATION [1] D ROOTWADS [1] D AQUATIC MACROPHYTES [1] - EXTENSIVE > 75% [11] OVERHANGING VEGETATION [1] O ROOTWADS [1] O AQUATIC MACROPHYTES [1] O MODERATE 25-75% [7] SHALLOWS (IN SLOW WATER) [1] O BOULDERS [1] ST LLOGS OR WOODY DEBRIS [1] SPARSE 5-25% [3] Max 20 PROTMATS [1] COMMENTS: 3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **STABILITY** Channel DEVELOPMENT MODIFICATIONS/OTHER CHANNELIZATION SINUOSITY T F O - HIGH [3] SNAGGING I - IMPOUND. CI - EXCELLENT [7] D-NONE [6] 0 - HIGH [4] ☐ - GOOD [5] - ISLANDS 汉-MODERATE [3] CI - RECOVERED [4] ☐ - MODERATE [Z] ☐ - RELOCATION (21 LOW [2] **夏** - FAIR [3]。 D - RECOVERING [3] DI- CANOPY REMOVAL I - LEVEED 🔀 - DREDGING - # # JET - BANK SHAPING T - RECENT OR NO D NONE[1] XX POOR [1] RECOVERY [1]

O ONE SIDE CHANNEL MODIFICATIONS

COMMENTS: RECOVERY [N TREAM WITH TEND DIE KHOE - REMOVE)

LIGHTING COMMENTS: RECOVERY IN TREAM WITH TEND DIE KHOE - REMOVE)

LIGHTING COMMENTS: RECOVERY IN TREAM WITH TEND DIE KHOE - REMOVE)

LIGHTING COMMENTS: RECOVERY IN TREAM WITH TEND DIE KHOE - REMOVE)

LIGHTING COMMENTS: RECOVERY IN TREAM WITH TEND DIE KHOE - REMOVE)

LIGHTING COMMENTS: RECOVERY IN TREAM WITH TEND DIE KHOE - REMOVE)

LIGHTING COMMENTS: RECOVERY IN TREAM WITH TEND DIE KHOE - REMOVED LIGHTING COMMENTS FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) **BANK EROSION** RIPARIAN WIDTH Riparian L R (Per Bank)

R (Most Predominant Per Bank)

R (Per Bank) ZZ AC - NONE [0] COM-MENTS: 5.]POOL/GLIDE AND RIFFLE/RUN QUALITY Pool/ CURRENT VELOCITY [POOLS & RIFFLES!] MORPHOLOGY MAX. DEPTH Current (Check All That Apply) (Check 1 ONLY!) (Check 1 or 2 & AVERAGE) T-POOL WIDTH > RIFFLE WIDTH [2] : -EDDIES[1] -- -- -TORRENTIAL[-1] 🗇 -> >1m [6] 🏥 E (1) O'-FAST[1] POOL WIDTH = RIFFLE WIDTH [1] 0.7-1m [4] O'-INTERWITENT[-2] "-POOL WIDTH < RIFFLE W. [0] # -MODERATE [1] **减**-0.4-0.7m [2] O.2-0.4m [1] **域"-SLOW**[1]。 D - < 0.2m [POOL=0] COMMENTS:</pre> Riffle/Run **CHECK ONE OR CHECK 2 AND AVERAGE** RUN DEPTH RIFFLE/RUN SUBSTRATE RIFFLE/RUN EMBEDDEDNESS RIFFLE DEPTH D-STABLE (e.g., Cobble, Boulder) [2] ☐ - MAX > 50 [2] ☐ NONE [2] □ - Best Areas >10 cm [2] Max 8 32 - MAX < 50[1] MOD. STABLE (e.g., Large Gravel) [1] □ - LOW [1] # - Best Areas 5-10 cm[1] ☐ - Best Areas < 5 cm INSTABLE (Fine Gravel, Sand) [0] ☐ - MODERATE [0] Gradient X - EXTENSIVE [-1] [RIFFLE=0] D - NO RIFFLE [Metric=0] COMMENTS: Max 10 6] GRADIENT (ft/mi): 10,75 DRAINAGE AREA (sq.mi.):\_ %POOL: 50 %GLIDE: 40 %RIFFLE %RUN: \*Best areas must be large enough to support a population of riffle-obligate fish species.

7/16/98

21.14

Is Sampling Reach Representative of the Stream (Y/N) / If Not, Explain:	Major Suspected Sources of Impacts (Check All That Apply):
REZENT CHIMNER MODIFICATION - SALEM WINT PLANT.	None 🗇
REZENT CHMNNEL MODIFICATION - SALEM WINT PLANT.  OPERATOR HAS NOTIFIED US CORP. OF ENGINEERS -	Industrial D
	Ag 🗇 Livestock 🗇
DONE BR CITY OF SAIDM	Silviculture  Construction
	Urban Runoff
Gear: Distance: Water Clarity: Water Stage: Canopy -% Open	CSOs O Suburban Impacts O
First	Mining Channelization
Sampling Pass E 0.16 Km >55 Low 60	Riparian Removal
Stream Measurements: Subjective Aesthetic Average Average Maximum Av. Bankfull Bankfull Mean W/D Bankfull Max Floodprone Entrend Rating Rating Width Depth Width Depth Ratio	Landfills 🗍 Natural 🗇
Rating Rating Width Depth Width Depth Ratio Depth Area Width Ratio	414 Dama - 1
Gradient 2 4 1 C CC	Other:
№ - Low, M Moderate, 🗆 - High [ 9-7 M : [9cM : 97cM : : : : : : : : : : : : : : : : : : :	
Stream Drawing:	
The state of the s	
	s No Is Stream Ephemeral (No pools,

Instructions for Scoring the Alternate Cover Metric: Each Cover Type Should Receive a Score of Between 0 and 3, Where:
0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality cover include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

totally dry or only damp spots)?

Is There Water Upstream? How Far:

Is There Water Close Downstream?

Is Dry Channel Mostly Natural?

Qualitative Habitat Evaluation Index Field Sheet QHEI Score:	_
River Code: 08-2°CRM: 40.3Stream M.F. BETVER CR.	
Date 07/299 Location GEORGETOWN RD.	
Scorers Initials: DTA Comments LATURY 40 53 34 80 53 08.	
SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % present);	
TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE ORIGIN SUBSTRATE QUALITY	-E1
Check ONE (OR 2 & AVERAGE)Check ONE (OR 2 &	) <u>_</u>
O -BOULDER [9] V STO-SAND [6] V O -LIMESTONE [1] SILT: O -SILT HEAVY [-2] O -COBBLE [8] V O -BEDROCK[5] Substra	te
O D-HARDPAN [4] O D-DETRITUS[3] O ·WETLANDS[0] O -SILT NORMAL [0]	i)
O HARDPAN (0) O SILT FREE (1)	H
O O-SILT [2] -SANDSTONE [0] EMBEDDED O -EXTENSIVE [-2] Max 2	0 آ
NOTE: (Ignore studge originating from point-sources;	J
score on natural substrates) 🔀 5 or More [2] 🔲 -LACUSTRINE [0] 🔘 -NORMAL [0]	
NUMBER OF SUBSTRATE TYPES: 0-4 or Less [0] 0-SHALE [-1] 0-NONE [1]	
COMMENTS	
2] INSTREAM COVER (see back for instructions for additional cover scoring method)  AMOUNT: (Check ONLY One or Cover	ŗ
TYPE: (Check All That Apply)	i)
UUNDERCUT BANKS [1] UPOOLS> 70 cm [2] UOXBOWS, BACKWATERS [1] UEXTENSIVE > 75% [11]  MS_/OVERHANGING VEGETATION [1] UROOTWADS [1] MS_/AQUATIC MACROPHYTES [1] UMODERATE 25-75% [7]	]
SHALLOWS (IN SLOW WATER) [1] D_LOGS OR WOODY DEBRIS [1] X - SPARSE 5-25% [3] Max 20	0
ROOTMATS [1] COMMENTS: NEARLY ABSENT < 5%[1]	
3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)	
SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER Channel	1
O-HIGH [4] O-EXCELLENT [7] DX: NONE [6] O-HIGH [3] O-SNAGGING O-IMPOUND.	
Ø · MODERATE [3] □ · GOOD [5] □ · RECOVERED [4] Ø · MODERATE [2] □ · RELOCATION □ · ISLANDS	IJ
SE-LOW [2] ST-FAIR [3] O-RECOVERING [3] O-LOW [1] ST-CANOPY REMOVAL O-LEVEED Max 20	3
O-NONE [1] O-RECENT OR NO O-BREDGING O-BANK SHAPING  RECOVERY [1] O-ONE SIDE CHANNEL MODIFICATIONS	*
COMMENTS:	
	em =
RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) BANK EROSION Riparia	
RIPARIAN WIDTH FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) BANK EROSION Riparial L R (Per Bank) L R (Per Bank) L R (Per Bank)	
L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank) C	
L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)	n ]]
L R (Per Bank)  L R (Most Predominant Per Bank)  L R (Per Bank)  D	n ]]
L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  D	n ]]
L R (Most Predominant Per Bank)  L R (Most Predominant Per Bank)  C CONSERVATION TILLAGE [1]  C C CONSERVATION TILLAGE [1]  C C CONSERVATION TILLAGE [1]  C C CONSERVATION TILLAGE [1]  C C CONSERVATION TILLAGE [1]  C C CONSERVATION TILLAGE [1]  C C C C C C C C C C C C C C C C C C C	n ]]
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# APPENDIX D

Analytical Laboratory Data Validation Report

#### 1.0 INTRODUCTION

On behalf of RÜTGERS Organics Corporation, Golder Associates Inc. (Golder Associates) has validated the analytical data for the sediment, surface water and fish tissue samples collected from the Middle Fork of the Little Beaver Creek (MFLBC) from February 12 – 20, 1999. The sediment samples were analyzed for the Organic Target Compound List (TCL) Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs), Pesticides, Polychlorinated Biphenyls (PCBS), and the Inorganic Target Analyte List (TAL). The analyses were performed in accordance with the U.S. Environmental Protection Agency (USEPA) <u>Test Methods for Evaluating Solid Waste, Third Edition (SW846)</u>, dated December 1996. Sediment samples were also analyzed for Total Organic Carbon, grain size, and Mirex, Photomirex and Kepone (MPK) The MPK sanalyses were performed in accordance with the CAL MPK SOP (Revision 6). Surface water samples were analyzed for select water quality parameters (Total Dissolved Solids, BOD, Ammonia, Nitrate, Nitrite, Phosphorus, and Total Suspended Solids). Fish tissue samples were only analyzed for MPK. CAL performed all the analyses at the facility in State College, Pennsylvania.

Two surface water locations and five sediment locations were sampled in duplicate for field duplicate analysis and rinsate blanks and trip blanks were collected on a daily basis.

Data validation of inorganic data was performed in general accordance with the <u>USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review</u>, dated February 1994. Data validation for organic data was performed in general accordance with the <u>USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review</u>, dated February, 1994. These documents are referred to as "functional guidelines" hereafter. MPK and water quality data were validated using the method-specific criteria described in the laboratory SOPs and the individual methods.

In general, the discussions which follow in Sections 2.0 through 7.0 describe only instances where the quality control criteria specified in the documents named above were not met. Data qualifiers are defined in Table D-1. Where quality control criteria were met, positive results were deemed acceptable and no qualifiers were applied. Non-detected results were qualified with a "U" flag signifying that the result is below the quantitation limit (organics) or detection limit (inorganics). Where more than one qualifier for a sample result was warranted, the most predominant or general qualifier was applied to the results. For example, a positive result for a volatile organic compound may need to be qualified as undetected (U) due to its presence in the associated blanks; however, the initial or continuing calibration criteria for that compound may not have been met and would warrant qualification as an estimated result (J) or quantitation limit (UJ). In this particular case, the compound would be qualified as having an estimated quantitation limit (UJ). The (R) qualifier, which signifies that the result has been rejected, takes priority over all other qualifiers.

In some cases, there are multiple degrees to which the quality control criteria may not be met. For example, a matrix spike recovery for an inorganic analyte may be slightly greater than the upper limit of the Contract Required Recovery range; the corresponding positive results may be qualified as estimated (J). However, if the matrix spike recovery is significantly greater than 150%, the positive results would be qualified as unusable (R). It should be noted that the discussions contained within Sections 2.0 through 5.0 explain where quality control was deficient. As specified in the functional guidelines, if the non-adherence to quality control criteria is slight, qualification of

data may not be warranted. However, if the non-adherence is significant, qualification and possible rejection of the data may be necessary. The narrative discussion specifies where rejection of the data is necessary. Following data validation and qualification, the analytical data and qualifiers for each sample point were summarized. Qualified results are tabulated in the main body of this report.

#### 2.0 TARGET COMPOUND LIST VOLATILE ORGANIC PARAMETERS

A total of fourteen (14) primary sediment samples were collected and submitted to CAL for analysis. Additionally, five (5) field duplicates were also collected during this sampling event. The samples were grouped into one SDG by the laboratory and analyzed for VOCs using SW846 8260. The SDG was validated in accordance with EPA Functional Guidelines for Organic Analyses as specified above.

# **Data Quality Objectives**

<u>Precision:</u> Goals for laboratory and field precision were generally met, except where noted below.

Accuracy: Goals for accuracy were met for all samples, except where noted below.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses.

Completeness: The data packages were complete for all requested analyses. A total of 19 sediment samples were validated in this data set. A total of <u>779</u> results for these samples were reported in which 779 were deemed valid. This results in a completeness of 100% for these samples.

#### **Major Deficiencies**

There were no major deficiencies identified for the VOC analyses.

#### Minor Deficiencies

Laboratory preparation blanks, field blanks, and trip blanks were evaluated for target compound contamination. The following compounds were detected in the blanks.

- acetone;
- chloroform;
- bromodichloromethane;
- carbon disulfide;
- 2-butanone; and,
- methylene chloride.

These contaminants were primarily associated with field activities. Laboratory pure water was not used during decontamination procedures or to generate the field blanks. For samples where the above listed compounds were detected as positive results below the Sample Quantitation Limit (SQL) and the action limit, the results were changed to the SQL and flagged as undetected (U). For samples where the listed compounds were detected as positive results above the SQL but below the action limit, the result was flagged as undetected (U) at the value reported. Samples with positive results above the action limit did not require qualification.

#### 3.0 TARGET COMPOUND LIST SEMI-VOLATILE ORGANIC PARAMETERS

A total of fourteen (14) primary sediment samples were collected and submitted to CAL for analysis. Additionally, five (5) field duplicates were also collected during this sampling event. The samples were grouped into one SDG by the laboratory and analyzed for SVOCs using SW846 8270. The SDG was validated in accordance with EPA Functional Guidelines for Organic Analyses as specified above.

# **Data Quality Objectives**

<u>Precision</u>: Goals for laboratory and field precision were generally met, except where noted below.

Accuracy: Goals for accuracy were generally met, except where noted below.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses.

Completeness: The data packages were complete for all requested analyses. A total of 19 samples were validated in this data set. A total of 1235 results for these samples were reported in which 1235 were deemed valid. This results in a completeness of 100% for these samples.

### **Major Deficiencies**

There were no major deficiencies identified for the SVOC analyses.

#### Minor Deficiencies

Bis(2-ethylhexyl)phthalate was detected in field blanks at a low concentration. Samples associated with this blank required qualification. For samples where the compound was detected as a positive result below the Sample Quantitation Limit (SQL) and the action limit, the sample result was changed to the SQL and flagged as undetected (U). For samples where the compound was detected as a positive result above the SQL but below the action limit, the result was flagged as undetected (U) at the value reported. Samples with positive results above the action limit did not require qualification. The method blanks did not contain any of the target compounds.

## 4.0 TARGET COMPOUND LIST PESTICIDE/PCB PARAMETERS

A total of fourteen (14) primary sediment samples were collected and submitted to CAL for analysis. Additionally, five (5) field duplicates were also collected during this sampling event. The samples were grouped into one SDG by the laboratory and analyzed for SVOCs using SW846 8081. The SDG was validated in accordance with EPA Functional Guidelines for Organic Analyses as specified above.

# **Data Quality Objectives**

Precision: Goals for laboratory and field precision were generally met, except where noted below.

Accuracy: Goals for accuracy were generally met, except where noted below.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses.

<u>Completeness:</u> The data packages were complete for all requested analyses. A total of 19 samples were validated in this data set. A total of <u>494</u> results for these samples were reported in which <u>494</u> were deemed valid. This results in a completeness of 100% for these samples.

## Major Deficiencies

There were no major deficiencies identified for the Pesticide/PCB analyses.

#### **Minor Deficiencies**

There were no minor deficiencies identified for the Pesticide/PCB analyses.

# 5.0 MIREX, PHOTOMIREX, AND KEPONE

A total of fourteen (14) primary sediment samples were collected and submitted to CAL for analysis. Additionally, five (5) field duplicates were also collected during this sampling event. A total of eighteen (18) fish tissue samples were also collected for MPK analysis. The samples were grouped into two SDGs by the laboratory and analyzed for Mirex, Photomirex, and Kepone using the RÜTGERS Organics SOP for determination of Mirex, Photomirex, and Kepone in Solid Samples (Revision 6.0). The SDGs were validated in accordance with the laboratory SOP and USEPA Functional Guidelines for Evaluating Organic Analyses taking into account method specific criteria.

## **Data Quality Objectives**

Precision: Goals for laboratory precision were met.

Accuracy: Goals for laboratory accuracy were met.

Sample Result Verification: All sample results were supported in the raw data.

<u>Detection Limits</u>: The detection limit goals were achieved for all analyses. Positive results reported below the reporting limits were qualified as estimated values.

<u>Completeness</u>: The data packages were complete for all requested analyses. Nineteen sediment samples and eighteen fish tissue samples were validated in this data set. A total of  $\underline{81}$  results for these samples were reported in which  $\underline{81}$  were deemed valid. This results in a completeness of 100% for these samples.

## **Major Deficiencies**

There were no major deficiencies identified for MPK analyses.

#### Minor Deficiencies

For several samples, mirex was reported as positive hit although the ion abundance ratios for identification of the compound were not met for all ions. These data were qualified as tentatively identified (N).

#### 6.0 TARGET ANALYTE LIST INORGANIC PARAMETERS

A total of fourteen (14) primary sediment samples were collected and submitted to CAL for analysis. Additionally, five (5) field duplicates were also collected during this sampling event. The samples were grouped into one SDG by the laboratory and analyzed for Metals using SW846 methodologies. The SDG was validated in accordance with EPA Functional Guidelines for Inorganic Analyses as specified above.

# DATA QUALITY OBJECTIVES

<u>Precision</u>: Goals for laboratory and field precision were generally met, except where noted below.

Accuracy: Goals for accuracy were generally met, except where noted below.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analysis.

<u>Completeness</u>: The data packages were complete for all requested analyses. Nineteen (19) samples were validated in this data set. A total of  $\underline{437}$  results for these samples were reported in which  $\underline{437}$  were deemed valid. This results in a completeness of 100% for these samples.

## **Major Deficiencies**

There were no major deficiencies identified for metals analyses.

## **Minor Deficiencies**

There were no minor deficiencies identified for metals analyses.

## 7.0 INDICATOR PARAMETERS

A total of fourteen (14) primary sediment samples were collected and submitted to CAL for TOC analysis. Additionally, five (5) field duplicates were also collected during this sampling event.

A total of fourteen (14) primary surface water samples were collected and submitted to CAL for TDS, BOD, TSS, Ammonia, Nitrate, Nitrite and Phosphorus analyses. Additionally, two (2) field duplicates were also collected during this sampling event.

# DATA QUALITY OBJECTIVES

Precision: Goals for laboratory and field precision were generally met, except where noted below.

Accuracy: Goals for accuracy were generally met, except where noted below.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analysis.

<u>Completeness</u>: The data packages were complete for all requested analyses. Nineteen (19) sediment samples and sixteen (16) surface water samples were validated in this data set. A total of 131 results for these samples were reported in which 131 were deemed valid. This results in a completeness of 100% for these samples.

#### **Major Deficiencies**

There were no major deficiencies identified for indicator analyses.

## **Minor Deficiencies**

There were no minor deficiencies identified for indicator analyses.

## 8.0 SUMMARY

Validation of the data collected for the MFLBC Impact Assessment was performed in accordance with National Functional Validation Guidelines, as applicable, and the criteria specified by the analytical methodologies and the CAL SOPs

Overall, the data required qualification due to some quality control criteria that were not achieved, but the majority of the data may be deemed usable in terms of objectives of the Work Plan. Although a positive result was qualified as estimated, the analyte should be considered present. Similarly, a non-detected result that was qualified as an estimated quantitation/detection limit should be considered not present for the purposes of this study, although the limit itself may not be precise. No data were rejected for this sampling event.

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## **TABLE D-1**

# **Data Qualifiers**

- U The analyte was tested for but was not detected. The associated numerical value is either the sample quantitation limit (organics) or the sample detection limit (inorganics).
- B- The analyte was detected at a concentration which is between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL). The data is acceptable.
- R Reject data due to quality control criteria. The data are unusable (analyte may or may not be present in the sample).
- N Tentative identification; consider analyte present.
- J- The analyte is present. The associated numerical value is an estimated quantity and may not be accurate or precise.
- UJ The analyte was tested for but not detected. The sample quantitation limit or the sample detection limit is estimated and may be inaccurate or imprecise.